CITY COUNCIL REPORT

Meeting Date: ***March 6, 2012***
General Plan Element: ***Public Services & Facilities***
General Plan Goal: ***Conserve water and encourage reuse of sewer***

ACTION

Provide direction related to potential changes in water and sewer rate methodologies as recommended in a recently drafted cost of service study.

BACKGROUND

Water Resources is in the process of completing a comprehensive cost of service study with the assistance of the Financial Consulting Solutions Group, Inc. The goal of the study is to evaluate its current water and sewer rate structures to determine a fair and equitable method for developing rates.

For the Water Fund the following factors were evaluated:

- Compare current use of meter size for cost allocation and rate design to allocating costs to appropriate customer classes (i.e. residential, multifamily and commercial),
- Allocate costs to appropriate drivers reflecting the cost of providing service,
- Level of revenue recovery to insure that the rate design recovers the full revenue requirement,
- Optimum rate structure to encourage water conservation.

For the Sewer Fund the following factors were evaluated:

- Customer classes relative to Biological Oxygen Demand, Chemical Oxygen Demand and Total Suspended Solids characteristics,
- Fixed versus variable cost components and the appropriateness of a minimum charge to maximize the potential for adequate revenue recovery,
- Industrial pretreatment program costs including Fats, Oils and Grease (FOG) monitoring and enforcement activities,
- Rate structure compliance with all applicable laws and regulations.

Water Rate Structure

The City's current water rate structure consists of several components, a monthly base fee determined by meter size and a monthly quantity usage charge, which is based on the amount of water used. The usage charge is a three-tier increasing block water rate structure, also known as an inverted block rate structure, in which an increased rate is charged for increased consumption. The amount of water allocated to each tier differs based upon meter size. All water charges are subject

to an environmental quality charge of 2.677 percent and a Storm Water Management fee of 1 percent.

The City adopted Fire Flows Ordinance 3738 in 2007 subsequently resulting in very few 5/8" and 3/4" meters being installed after that date. A two tier rate structure was developed in 1982 and a third tier was added in 2005. The third tier was designed to encourage water conservation associated with the top 5 percent of water users, which is consistent with the City's Drought Management Plan. As indicated below, introduction of the third tier has not significantly changed total water usage patterns.

Fiscal Year	Millions of Gallons				Rainfall in Inches
	Tier 1	Tier 2	Tier 3	Total	
2006/07	7,713	10,197	950	18,860	7.20
2007/08	9,213	13,075	1,202	23,490	9.17
2008/09	9,230	12,417	936	22,583	8.04
2009/10	9,169	12,150	958	22,277	7.68
2010/11	9,225	12,004	893	22,122	4.89

Alternatives to the meter size based tier allocation have been evaluated specific to Scottsdale demographics and applicable City Code requirements. The recommended class based rate alternatives are noted below in the Analysis and Assessment section.

Sewer Rate Structure

The City's current sewer rate structure consists of a flow charge for capital costs as well as a flow charge for operation and maintenance expenses. These charges vary by customer classification and are based upon relative sewage strengths. There are currently sixteen separate sewer customer classifications. The amount a customer is billed for sewer is estimated based upon 90 percent of their average water use from December through February of each year. All sewer charges are subject to an 18.953 percent environmental charge.

The recommended sewer rate impacts are noted below in the Analysis and Assessment section.

Community Involvement

Four stakeholder meetings were conducted by the City (Jan. and Feb. 2012) to present proposed changes to residential, multi-family and commercial water and sewer rate structures. Approximately 50 residential and commercial customers participated in January. February meetings are scheduled for the 29th and data is not yet available. The City also received comments via an internet survey and emails to the Enterprise Finance group.

ANALYSIS & ASSESSMENT

Periodically reviewing the water and sewer cost of service rate structure is consistent with the City's goal to ensure that water and sewer rates recover all direct and indirect costs of service and are fairly and equitably assessed to customers. Total direct and indirect costs, known as the revenue

requirement include operating cost, maintenance costs, indirect costs, capital replacement, debt service and required reserves.

Water Fund

For the Water Fund the following recommendations are proposed:

- Implement a five tier rate structure for single family residential customers which will equitably distribute costs over meter sizes and enhances the potential for reduced water consumption,
- Implement a four tier rate structure for multi-family and commercial customers which will equitably distribute costs over meter sizes and enhances the potential for reduced water consumption,
- Reduce the base fees and low water volume charges while shifting costs to higher water use,
- Incorporate the environmental fees into the basic revenue requirement and remove the additional rate structure component.

Sewer Fund

For the Sewer Fund the following recommendations are proposed:

- Update the user charge formula to utilize Chemical Oxygen Demand (COD) rather than Biological Oxygen Demand (BOD),
- Update customer class discharge characteristics (COD and Total Suspended Solids) based on more recent industry standards,
- Create a new customer classification for non-compliant sewer dischargers,
- Incorporate the customer service charge and environmental fees into the basic revenue requirement and remove the additional rate structure components.

Financial Policies

The City of Scottsdale's adopted financial policies require water and sewer rates and fees to be examined annually to ensure that they are recovering all costs of service and that rate adjustments be based on five-year financial plans. Consistent with these policies, the City uses a comprehensive multi-year Water and Sewer Enterprise Funds Financial Plan that incorporates all projected operating and capital expenses and revenues to determine the cash needs of the water and sewer funds. Particular emphasis is focused on the first five years of the planning period to identify the revenue requirements and to determine an appropriate balance between rate increases and debt financing to achieve rate stabilization over the five year period. The City sets water and sewer rates based on the revenue requirements identified in the Water and Sewer Enterprise Funds Five-Year Financial Plan that is updated annually.

Customer Impacts - Water

By establishing tiered water rate structures that are separate from meter sizes, all customers are provided consistent tier break points and equal unit costs per tier. The structure is user friendly as it is straight forward and easy to interpret.

By reducing water base fees and slightly decreasing the lowest water tier rates, low water users will experience slightly lower water bills. These reductions are offset by increasing the higher water tier rates, which will result in higher water bills for high water users.

The overall goal this year is for the Water Fund to be revenue neutral however the impacts of the new water rate structures will shift costs away from low water users and reallocate them to high water users.

Customer Impacts - Sewer

By updating the customer class discharge characteristics some costs will be shifted from one customer base to another with the most notable impacts to restaurants and businesses with dining. These customers will experience higher monthly sewer bills while other classes will see slightly reduced monthly bills.

Implementation of a non-compliant discharger class will allow the city actively enforce FOG programs and goals.

The overall goal this year is for the Sewer Fund to be revenue neutral, however the impacts of the revised customer class discharge characteristics will shift costs away from several customer classes and reallocate them to restaurants, bakeries and commercial with dining classes – this shift more accurately collects revenue based upon sewer loadings (customers cover costs they create) and is consistent with other valley cities that attempt to collect sewer revenue based upon costs.

RESOURCE IMPACTS

Available Funding
Available funding is not applicable.

Staffing, Workload Impact
Water Resources staff will implement rate structures and coordinate with necessary city divisions. Sufficient staff time is currently available to support process.

Future Budget Implications
The revise rates could modify budgeting requirements.

OPTIONS & STAFF RECOMMENDATION

Recommended Approach

Authorize recommended changes to water and sewer rates as recommended in a recently drafted cost of service study.

Alternative Approach
Keep current water and sewer rates in effect.

RESPONSIBLE DEPARTMENT(S)

Water Resources Department.

Finance & Accounting.

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ATTACHMENTS

1. Draft Cost of Service Study

City of Scottsdale, AZ

WATER & WATER RECLAMATION COST-OF-SERVICE RATE DRAFT STUDY REPORT

February 2012

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SECTION I: INTRODUCTION

In March 2011, the City of Scottsdale (City) contracted with FCS GROUP to perform a comprehensive cost-of-service study for its water and water reclamation utilities. The study consisted of three distinct elements:

- Financial Policy Review
- Revenue Requirement Forecast (Utility Financial Plan Development)
- Cost-of-Service Rate Design

In order to meet these goals, FCS GROUP collected and reviewed a variety of documents from the City, including accounting records, City policies, utility operating budgets, debt service schedules, capital improvement program costs, and comprehensive customer data statistics. With these sources, FCS GROUP developed cost projections to assess system revenue requirements, allocated the projected costs between customer classes, and developed a number of rate alternatives for the City's water and water reclamation utilities.

A. BACKGROUND

The City Scottsdale's water and water reclamation utilities provide services to approximately 217,000 residents and 5,000 businesses.[1] The City's utility infrastructure has progressively expanded over time to accommodate a growing customer base. The current system spans 185 square miles, consisting of 2,030 miles of water transmission and distribution pipelines, 1,400 miles of sewer collection pipeline, and 43 lift stations. To meet customer water demands, the City accesses 43 storage reservoirs, existing groundwater, reclaimed water, water from the Salt and Verde River watersheds, and water from the Colorado River through the Central Arizona Project. Given the region's arid climate and the need to conserve potable water resources, reclaimed water has become an important resource that has helped the City meet its irrigation demands.

In order to meet the continuing needs of existing customers as well as meet the expected needs of future customers, the City has developed a capital improvement program (CIP) that quantifies the level of capital investment needed over the next 20 years. In addition to the capital requirements placed on the utilities, increasing operating costs must also be met by system operating revenues. As stated in the project Request for Proposal (RFP), the City desires to keep utility bills affordable for its customers, with the long-term policy goal to keep rate increases at or below the Consumer Price Index (CPI) for water and water reclamation services. To meet this goal, the City has developed a financial plan for each utility that incorporates a strategy to fund capital investment needs through a blend of cash ("pay-as-you-go") and debt resources.

The City has had two major rate studies in the past 10 years:

[1] Source: Scottsdale Community Overview 2010-2011 and 2010 Census

2002 Cost-of-Service Rate Study

Prior to the 2002 study, the last official rate study on record was performed in 1982. The rate structure prior to the 2002 study consisted of the following features:

- Separate inside/outside City limit rates
- Base fee with minimum usage allowance
- Two-tiered volumetric rate structure
- Environmental fee added to total bill

The 2002 study cited the need for a new water rate structure to "more effectively address the equity of cost recovery from different customer classes." It was additionally noted that the 1982 Study provided "limited cost-of-service analysis to support the calculation of historical and existing rates and charges." Subsequently, the study recommended removal of the inside/outside City limit rates, the minimum usage allowance for the base fee, and the environmental fee. The 2002 Study recommended the following rate structure:

- Base fee dependent on meter size (no minimum allowance)
- Three-tiered volumetric rate structure (same for all classes; volume thresholds increase with meter size)
- No environmental fee added to total bill

Following the consultant's recommendation, the City adopted the rate structure for the water utility – however, the City did not remove the environmental fee from the bill calculation.

The 2002 Study found that the water reclamation rate structure was recovering costs equitably from customers, and consequently did not recommend any cost shifts between classes. However, it noted that the rates were not generating sufficient revenue to cover costs – water reclamation rates would have to be increased to correct the deficit. The current water reclamation rate structure consists of the following elements:

- Monthly account fee (customer service charge)
- O&M volume charge
- Capital volume charge

The monthly account fee is charged equally to all customers, regardless of customer class. The O&M and Capital charges vary depending on customer class to account for differing sewer strength characteristics. Customers are subject to a minimum charge.

2008 Staff Rate Study

The 2008 Study focused primarily on revenue requirements, justifying a series of rate increases in the ensuing years. The study cited increased costs from regulatory compliance and major capital projects as the main driving force behind the rate increases for both utilities. To comply with groundwater regulation, the City faced increased costs from:

- **Adding Supply:** Additional water supplies were needed to reduce the use of groundwater

- **Treatment:** Because surface water is harder to treat than groundwater, more surface water treated equates to increased treatment costs for the water utility
- **Distribution:** The use of a central treatment facility required increasing the distribution system

The 2008 Study cites enhanced arsenic treatment, expansion of the Central Arizona Project (CAP) treatment plant, and system rehabilitation and revitalization as major capital needs. For the water reclamation utility, the major capital projects related to expanding the utility's two treatment plants and rehabilitating the collection system on an ongoing basis. The report forecasted rate increases ranging from 2.0% to 4.5% per year through FY 2013/14 for both the water and water reclamation utilities. Based on the "Option B" scenario developed by City staff to recognize the difficult economic times, the 2008 Study led to water and water reclamation rate increases of 2.5% and 3.0% (respectively) in FY 2009/10.

The 2008 Study concluded that the existing rate structures sufficiently provided an equitable basis for recovering costs from customers. However, it outlined possible improvements in the rate structure to enhance equity in the future. For example, an analysis of customer usage patterns provided evidence that converting to a rate structure based on distinct customer classes might provide increased equity amongst the City's customers. Similarly, a possible consolidation of the water reclamation rate structure may better serve the City's needs by grouping similar customers together and easing the administrative burden of the rate structure.

2011 Rate Study

The economic landscape within the City (and the greater Phoenix Valley) has drastically changed since 2008. The current cost-of-service rate study updates the rate structures and financial forecasts are based on these new conditions. The proposed rate structures and financial forecaster are designed to provide the City with the following:

Sufficient revenues to support operations and capital investment needs for both the water and water reclamation utilities

- Promotion of long-term financial health (support maintaining high bond ratings and decrease cost of long-term financing)
- Continued ratepayer equity through cost-of-service rate structures
- Rates that can be easily understood and implemented
- Balance between financial needs and impacts on rate payers
- Utilizing debt financing to balance use of cash funding

The following sections of the report will outline and detail the processes used to design the proposed rates and rate alternatives for the water and water reclamation utilities.

B. STUDY COMPONENTS

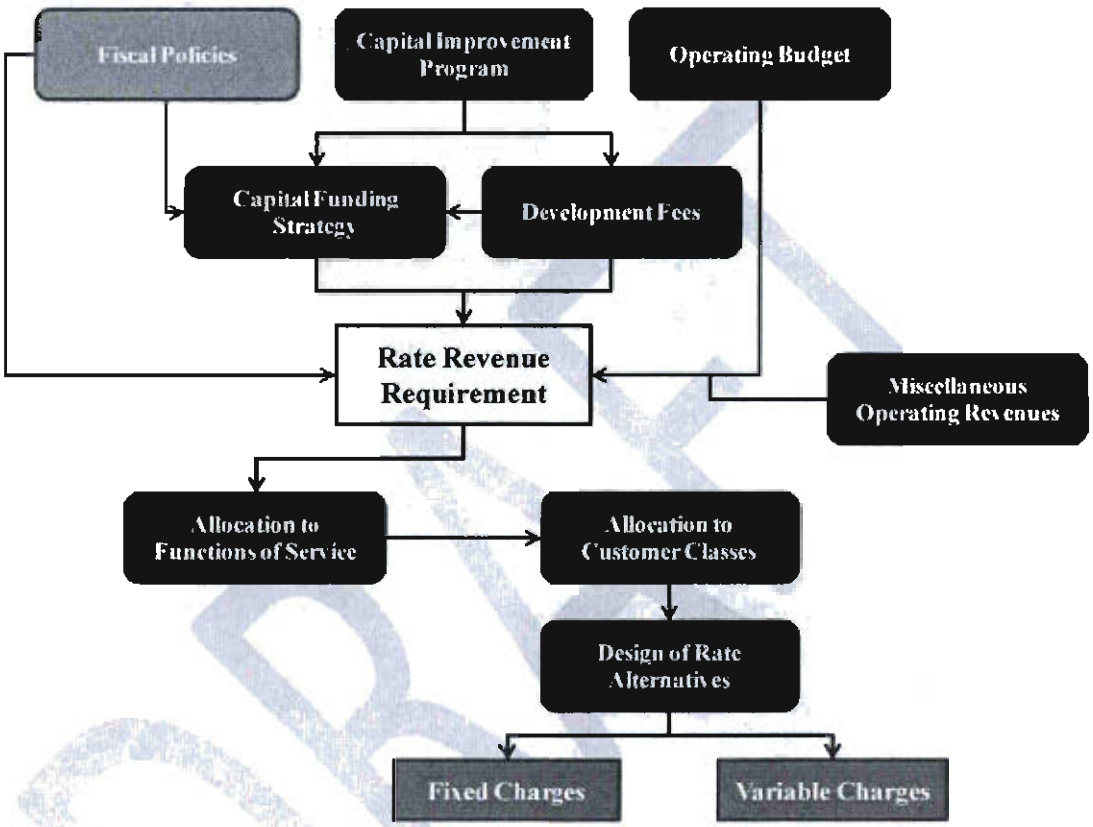
A cost-of-service rate study is generally split into three components.

- Task One: Determine the utility rate revenue requirement, based on projected operating and capital costs and offsetting fee revenue sources

- Task Two: Allocate the utility rate revenue to customer classes, based on the relative demands that they impose on the system
- Task Three: Design rates to recover each class' allocated cost of service

Exhibit 1 illustrates this process in more detail.

Exhibit 1: Utility Rate Study Methodology



B.1 Revenue Requirement

The revenue requirement analysis combines the revenue needs of operations, capital investment, and policy compliance. It defines "revenue sufficiency" in terms of two tests: the cash flow sufficiency test and the debt service coverage test.

B.1.a Cash Flow Sufficiency Test

The cash flow sufficiency test is used to define the required level of revenues needed to meet the cash expenditure obligations for each utility, including operation and maintenance costs, debt service payments, and any rate-funded capital needs or additions to reserves (to comply with minimum balance requirements). Resources used to offset the amount required from rates include miscellaneous fee revenues, interest earnings, and existing rate stabilization balances and reserves.

B.1.b Debt Service Coverage Test

The debt service coverage test evaluates revenue needs based on the need to comply with requirements placed on the utilities through bond covenants associated with outstanding debt.[2] In particular, a utility's debt service coverage requirement mandates that it maintain "net revenues" equal to or greater than a defined multiple of annual debt service. The City's bond covenants define the "net revenues" eligible for consideration in this test – generally speaking, it includes operating revenues and development fees, net of operating expenses (note that reserve funding and rate-funded capital expenditures are excluded from coverage calculations). Aside from differences in specific line items considered, this sufficiency test differs from the cash flow sufficiency test in that it focuses exclusively on annual performance – while the cash flow sufficiency test allows the use of existing fund balances to cover cash flow obligations, the coverage test generally does not include existing balances in the definition of "net revenues."

It is worth noting that in addition to the minimum requirements specified by the bond covenants, many cities and agencies have financial policies that impose more stringent coverage requirements on their utilities. For example, the City has historically planned to maintain a coverage ratio higher than 1.2 times all utility debt service, minimum required by its bond covenants. Such policies generally result in higher near-term rates, but mitigate the risk of a coverage default in times of unanticipated reduced revenues and/or increased expenditures. Longer-term, they result in lower overall costs as they facilitate higher bond ratings (with lower interest rates for future debt issuance) and generate cash surpluses that offset the need for future borrowing.

B.2 Cost-of-Service Analysis

The cost-of-service analysis allocates costs to customer classes based on the demands they impose on the system. The American Water Works Association (AWWA) defines a two-step process for allocating costs to customers:

1. Allocate costs to functions of service
2. Allocate costs to customer classes based on relative demands

B.2.a Customer Data Analysis

The cost-of-service analysis begins by analyzing customer data in order to establish the number of accounts, meter equivalents (MEs), and usage statistics in order to determine usage trends and establish metrics for which to allocate costs across customers.

City staff provided customer data for the three-year period beginning in FY 2007/08 and ending in FY 2009/10. The customer data was broken down into the City-defined customer classes by Standard Industrial Classification (SIC) code. FCS GROUP compiled the statistics for FY 2009/10 and applied the corresponding rate structure to estimate revenues and calibrate the analyses for future projections. Generally speaking, the FY 2009/10 statistics reconciled relatively well with actual revenues reported in the City's Comprehensive Annual Financial Report (CAFR). The water utility statistics were

[2] Bond covenants are the legal requirements established at the time of any debt issuance and are captured in the bond official statement (indenture). The official statement holds important information regarding the issuing party, underwriters, market conditions, and any restrictions or requirements placed on the borrower as part of the debt issuance. For the purpose of this test, the minimum required coverage factors are sourced from these documents.

decreased by about 1.2% to reconcile with actual reported revenues, most likely due to the fact that (a) as a course of normal utility billing activities, adjustments are made to individual bills that are not reflected within the customer statistics and (b) there can be a slight delay between billed and reported revenues. The water reclamation utility statistics were increased by about 3.5%, primarily due to an anomaly found in reconciling revenues reported through the billing system to revenues reported in the City's CAFR. Once calibrated, the aggregated customer data is then forecasted out over the study period (based on assumed customer and demand growth rates) in order to allow for an allocation of costs in future years.

8.2.b Cost Allocation

The second step of the cost-of-service analysis is the allocation of costs across the different functional constituents of the utility and the different customer classes. The purpose of the cost-of-service analysis is to produce an equitable and legally defensible rate structure through a systematic allocation of costs. This cost allocation determines the amount of revenue to be collected from the different rate components and customer classes.

As previously noted, the costs are allocated in two ways: (1) allocation of costs to functional components of the utility and (2) to the utility's various customer classes. The functional constituents for the water utility were defined by utility's Master Plan:

- **Base Capacity:** Costs that are associated with meeting an average annual (or "base") rate of use. In addition to including a portion of the water system's fixed costs, variable operating costs such as chemicals and power are most often allocated to this category. These costs are most equitably allocated to customers based on average or "base" water usage.
- **Peak Capacity:** Incremental system costs associated with providing the extra system capacity to meet extra demand during peak periods. These costs are most equitably allocated between customers based on incremental demands they require during peak periods.
- **Fire Protection:** Fire protection costs are often associated with providing the extra capacity needed to accommodate fire flows in the system. This would include both costs that are directly associated with fire protection (such as hydrant maintenance costs) and costs that are associated with over-sizing the reservoirs and mains in the system to provide fire flow.
- **Customer:** These costs relate to customer service and billing, and are generally allocable to all customers regardless of their usage patterns.

The functional cost allocation for the water reclamation utility uses industry standards to develop cost allocations to the different functional constituents. The functional components for the water reclamation utility include:

- **Flow:** Costs associated with the quantity of sewage discharge. For example, the collection system is primarily used to convey sewage of varying strengths to the City's treatment facilities. These costs are most equitably allocated to customers based on the flows that they generate.
- **Chemical Oxygen Demand (COD):** Costs associated with providing the treatment of dissolved chemical and organic materials. These costs would appropriately be allocated to customers based on the strength of their sewage discharges (in terms of COD), as either estimated in system planning documents or directly measured (for commercial/industrial users).
- **Total Suspended Solids (TSS):** Costs associated with removal of solids from the sewage discharge. Similar to COD, these costs are most equitably allocated to customers based on the

strength of their discharges (in terms of TSS), as either estimated in system planning documents or directly measured (for commercial/industrial users).

- **Customer:** As with the water utility, these costs primarily relate to customer service and billing and can be equally allocated to all customers regardless of sewage discharge volume or strength.

B.3 Rate Design

The designing of rates is the final step, providing the mechanism by which the allocated costs can be equitably, efficiently, and legally recovered from customers.

The City requested that multiple rate alternatives be designed in conjunction with an update of the existing rate structures. The goals of the rate alternatives were as follows:

- Promote conservation
- Simplify the existing rate structure to reflect a rational assignment of customers into customer classes based on common usage patterns and service requirements
- Equitably recover costs from the different customer classes

B.3.a Current Rate Structure and Rate Alternatives - Water

The current rate structure for the water utility focuses on water meter size as a key indicator of water usage patterns. The rates reflect an increasing block structure (where the rate per unit increases with consumption, within defined thresholds) to promote water conservation. To reflect the higher base fee payments for larger meter sizes (which are based on the assumption that demands generally increase with meter size), the City's current rate structure also increases the size of each block as the size of the meter increases. This complication, though justifiable in that it accounts for the capacity purchased by customers with larger meters, creates a fair amount of complexity in the billing system.

Exhibit 2 summarizes the water rate alternatives developed for the City.

Exhibit 2: Summary of Water Rate Structure Alternatives

Rate Alternative	Description
Update of Existing Structure	Consistent with the existing structure, customers pay a fixed charge based on their meter size; the volume charge structure is based on a series of thresholds that increase with water meter size.
Class-Based Rates	Groups customers into three groups (single-family residential, multi-family residential, and commercial) while retaining the existing block thresholds for volume charges
Class-Based Rates with Seasonal Commercial & Multi-Family Volume Charges	Commercial and multi-family residential customers are charged a single class-specific volume rate for all usage. Single-family residences retain a block structure with adjusted tiers that reflect recent single-family usage patterns.
Water Budgets (Single-Family Residential Only)	Created an allotment of water usage for single-family customers depending on the size of their lot

B.3.b Current Rate Structure and Rate Alternatives – Water Reclamation

The current rate structure for the water reclamation utility identifies 16 customer classes based on different business types. The rates are further broken up into an account charge and volumetric charge – the volumetric charge has two components to recover costs associated with operational costs and capital costs, and is based on 90% of the customer's average water consumption between December and February. In addition to the fixed account charge and volumetric charge, there is an environmental fee set to 18.953% of the total water reclamation charge. The current water reclamation rate structure defines a single minimum monthly charge for all customers.

The rate alternatives developed for the water reclamation utility focused on different goals than those of the water utility. The primary goal of the water reclamation rate alternatives is to reflect meaningful and rational distinctions between customer classes. **Exhibit 3** summarizes the rate alternatives, all of which retain the basic structure of a fixed account charge and a volumetric charge.

Exhibit 3: Summary of Water Reclamation Rate Structure Alternatives

Rate Alternative	Description
Update of Existing Structure	Consistent with the existing structure, customers pay a fixed account charge and a volume charge based 90% on their December – February water usage (with a minimum charge). There are different rates for a relatively large number of classes.
Simplified Class Structure	Reduces the number of customer classes into three groups: single-family residential, multi-family residential, and commercial
Strength-Based Rates	Establishes a differential rate for customers based on the relative strength of their sewage discharges.
Volumetric Structure With Cap for Single-Family Usage	Volumetric charges are based on actual instead of winter-average water usage. Single-family residential usage is capped based on winter-average water usage to account for higher demands during peak periods associated with irrigation usage

C. PRELIMINARY RESULTS

FCS GROUP developed a number of water and water reclamation rate structure alternatives, as shown respectively in **Exhibit 2** and **Exhibit 3**. These rate structures were designed to produce enough rate revenue to satisfy each utility's revenue requirement (as determined by the cash flow and coverage sufficiency tests) and achieve other objectives of interest to the City, such as:

- Promoting equitable cost recovery based on the demands that customers place on the system
- Balancing conservation-oriented price signals with the need and desire for financial stability
- Developing rate structures that are easy to implement and explain to customers

SECTION II: FINANCIAL POLICIES

Financial policies are fundamental to good financial management and provide a standard for assessing fiscal performance. These policies can serve as guidelines for operational and strategic decision-making that identify acceptable and unacceptable courses of action. Furthermore, establishing financial policies can promote standardization, stability, continuity, and financial balance. This section provides background on the City's existing financial policies as well as policies for the City's consideration, including minimum target balances and financial management practices.

A. UTILITY RESERVES

Utility reserve policies are intended to create a measure of safety and security for uncertain events of the future that impact a utility's financial health. Reserves can address variability and timing of expenditures and receipts of revenues, as well as occasional disruptions in activities, costs, or revenues. The general objectives of these policies are to facilitate stable and predictable rates and funding sources. Collectively, these policies enable the utility to manage the financial risks that it faces.

City staff provided information detailing reserve structures as shown in **Exhibit 4**:

Exhibit 4: Summary of Reserve Structure

Reserve	Description/Purpose
Operating Reserve	Provides working capital for day-to-day operations and absorbs fluctuations in cash balances due to routine differences in revenue and expense cycles.
Replacement and Extension Reserve	Holds funds used for the replacement of water and water reclamation infrastructure to comply with its bond covenants. Such reserve will equal 2 percent of the gross book value of all tangible fixed assets of the system and shall be utilized only to provide contingency funding and expenditure flexibility during times of unusual circumstances.
Revenue Bond Debt Service Reserve	The Revenue Bond Debt Service Reserve holds funds that the City must keep in reserve to comply with its bond covenants. The annual reserve requirement is set to equal the maximum remaining annual Revenue Bond debt service payment.

A.1 Operating Reserve

The Operating Reserve provides the minimum unrestricted fund balance needed to accommodate the short-term cycles of revenues and expenses. They provide the necessary "cushion" which can be used to cover cash balance fluctuations on a month-to-month basis. These reserves are intended to address both anticipated and unanticipated changes in revenues and expenses. Anticipated changes might include billing and receipt cycles, payroll cycles, and other payables. Operating reserves can also be used to meet short-term cash deficiencies due to unanticipated changes in usage for water utilities,

such as drought years in which users consume less water (either through choice or through City mandate).

A.1.a Reserve Levels

Generally, utilities should target a defined minimum reserve level that provides the liquidity needed to allow regular management of payables and payment cycles. When setting this reserve level, the utility should consider the policies of its other reserves. Depending on the variability of receipts and payables, the target level of an operating reserve can range from as little as 30 days to as much as 180 days of the utility's annual operating expenses.

As of this study, the City currently targets an Operating Reserve balance of 60 to 90 days for its water and water reclamation utilities. The minimum reserve target is set at 70 days for water utility and between 60 to 65 days for the water reclamation utility as it was deemed to provide the necessary cash balance to meet the aforementioned account balance fluctuations. Furthermore, reserve balances funded at less than the 90 day maximum coincides with the City's desire to keep cash balances at a minimum level without causing fiscal strain on the utilities.

A.1.b Replenishing Reserves

The reserve should be reviewed annually and recalibrated through the normal budget and rate-setting process. Since expenses typically increase over time, the reserve target should also increase proportionally with increased expenditures. In times where the reserve target is below or projected to fall below the minimum target, rates should incorporate a provision to add to the operating reserve.

A.1.c Use of Reserves

In conjunction with establishing a minimum target balance, a maximum target balance for the Operating Reserves has been set. The City currently establishes a maximum reserve balance equal to 90 days of operating expenses. After discussions with City staff, it was agreed that this target is an appropriate target. The analysis is structured to transfer cash above 90 days of operating expenses to capital projects. These transfers are intended to utilize available cash for capital project funding and reduce the need to issue debt to fund large capital projects.

A.2 Replacement and Extension Reserve

A Replacement and Extension Reserve should contain the necessary funds to build new infrastructure and repair or replace aging infrastructure. This reserve generally reflects available cash that is specifically dedicated to capital investment purposes, and not assumed to be available to fund operating expenses and related cash flow requirements. Similar to the Operating Reserve, the Replacement and Extension Reserve must hold a reasonable level of funds that cover the fluctuations in capital related spending. It is worth noting that although the City actually tracks the Replacement and Extension Reserve as part of its Operating Fund, this analysis keeps these funds (along with debt proceeds) explicitly segregated for capital investment purposes.

A.2.a Reserve Levels

In order to account for fluctuations in capital-related spending, an appropriate reserve amount should be held in the Replacement and Extension Reserve. However, it is difficult to target reserve balances to annual capital expenditures as there are generally large variations year to year. To solve this problem, utilities often set the target balance to a percentage of existing fixed assets. This target is

appropriate for two reasons: (1) the City is continually replacing a percentage of its existing infrastructure and therefore should plan for such in their reserves, and (2) it creates a reasonable level of protection against the financial impacts that would otherwise result from periods of significant capital investment.

The City's bond indenture requirements state that the minimum Replacement and Extension Reserve shall "equal two percent (2%) of the gross book value of all tangible fixed assets of the system." This requirement establishes a minimum target. However, as the City has done to date, the City also considers long-term capital needs and benchmarks its fund balance targets against its capital needs. Given that the City has the ability to issue debt to cover costs in excess of other resources, this analysis retains the minimum balance required by the City's bond covenants.

A.2.b Replenishing Reserves

The Replacement and Extension Reserve is funded through the various resources that are either restricted or otherwise earmarked for capital investment purposes. Capital project expenditures are funded through a mixture of rates, development fees, and debt. When these funding sources are insufficient to fund capital expenditures and reserve balances are subsequently reduced, the City will need to either (a) provide additional funding from rates, (b) issue additional debt (or inter-fund borrowing) to cover the incremental costs, or (c) consider deferring project expenditures until additional funding becomes available.

A.2.c Use of Reserves

As previously noted, the Replacement and Extension Reserve is the means by which capital expenditures are funded annually; it acts as a holding reserve for any funds appropriated for capital expenditures. Because the City considers long-term capital needs and plans accordingly the Replacement and Extension is funded at more than the minimum target balance; the higher than minimum balance is used to avoid triggering the replenishment provision included in the City's bond indenture requirements (if the balance falls below the target level, rates must fund a transfer equal to 2% of net revenues to the Replacement & Extension Reserve).

A.3 Revenue Bond Debt Service Reserve

As part of most bonding efforts, the borrowing city or agency is often required to establish a contingency reserve to protect against the possibility of defaulting on an annual debt payment. Based on the City's existing bond agreements, the Reserve is to maintain a minimum balance equal to the annual debt service payment on outstanding Refunded Revenue Bond debt. Money in this reserve is generally not available for other uses until the related debt imposing the reserve requirement is repaid (at which time the reserve could be released to make the final payment).

B. CAPITAL FUNDING

Capital needs can be defined by a capital plan and capital-related policies. Capital resources, such as rate-funded capital, development fees, debt, and repair and replacement reserves are defined and constrained by fiscal policies and practice. Utilities can typically draw funds for capital improvement projects from a variety of sources. For this study, capital resources are defined as the following:

- **Grants:** Grants are typically designed for a specific purpose, such as correcting existing system deficiencies to comply with state or federal regulations or encourage development of rural areas. However, City policy dictates that grant funding should be used to leverage existing funds rather

than be relied upon to fund ongoing programs. The City received an EPA grant for the construction of regional facilities, which does dictate some requirements with regards to the City's rate structure.

- **Developer Contributions:** Developers are often required to build local collection and distribution infrastructure, as well as expand the general system infrastructure as necessary, to serve new developments and donate those assets to the utility in exchange for receiving utility service. This analysis does not assume the availability of any such contributions.
- **Debt:** The primary benefit of using debt to finance projects is that it allows utilities to spread a relatively large cost over multiple years. The specific terms (interest rate, length of repayment period, etc.) generally vary for different types of debt (Municipal Property Corporation or MPC bonds, General Obligation or GO bonds, Revenue bonds, inter-fund loans) and may come with unique features like deferred principal repayment.
- **Development Fees:** A development fee is a charge imposed on new developments as a condition of receiving utility service. The City's development fees are designed to recover the current buy-in value of all capacity in existing facilities; plus the value of future of future capital improvements providing additional capacity.
- **Rate-Funded Capital:** The City might wish to fund a portion of its capital program through direct rate funding on a periodic basis. However, user rate funding should be coupled with other capital funding sources to prevent undue rate spikes.
- **System Reinvestment (Depreciation) Funding:** In addition to explicit rate-funded outlays, a number of utilities fund system reinvestment through rates. As a quantitative measure of the decline in asset value over time, depreciation is commonly used as a benchmark for establishing annual system reinvestment funding levels from rates. Given that it is a relatively discretionary (but prudent) fiscal policy, the City has the flexibility to phase in annual funding from rates.

In addition to requiring a balanced capital budget, the City targets a minimum amount of pay-as-you-go funding for each five-year planning period.[3] This target is assumed to be flexible in that if it is deemed to adversely impact rates, it may be scaled back on a temporary basis using other financing sources. The policy decision to fund system reinvestment through rates has two main purposes: (1) to support the City's goal of funding a significant portion of capital expenditures through pay-as-you-go (non-debt) sources, and (2) to mitigate the potential rate impacts of funding capital expenditures directly through rates. Further discussion regarding the benefits and drawbacks of cash versus debt financing is continued below.

B.1 Cash v. Debt Financing

Given the variety of available funding sources, utilities often find themselves having to choose among funding sources when establishing a financing plan. While grants and development fees would first be applied to capital projects costs (as they essentially represent "free money" to the utility) the next choice in the funding "hierarchy" is not necessarily apparent. That being said, it is easy to group funding sources into two categories, cash and debt, or in the City's case "pay-as-you-go" funding and debt funding.

Ultimately the specific decision regarding whether to fund projects by debt or by cash is a policy decision that is driven by a number of considerations. While cash funding can be cheaper in the long

[3] Pay-as-you-go funding is defined as financing from all sources other than debt issuance.

run because there is no interest cost, debt funding allows for the payment of project costs over an extended period of time. Likewise, using development fees to pay debt service will lead to a higher interest expense but will be partially offset by the interest earned on the development fees kept in reserve. Additionally, using debt to spread the cost over time will provide a mechanism by which future customers pay for their fair share of system costs, referred to as intergenerational equity

As it stands, the City is dedicated to maintaining its high credit rating. Therefore, a premium is placed on the need for a well-managed and effective capital funding program.

B.1.a Debt Considerations

Debt can be issued for investments in system infrastructure that provide capital assets, and generally may not be used to fund ongoing utility operating and maintenance costs. When debt is used for capital investment, the term of the debt should not exceed the reasonable useful life of the asset(s) being acquired or constructed. As previously mentioned, the primary benefit of using debt to finance capital projects is that it allows utilities to spread a relatively large cost over multiple years and a larger customer base. Additionally, debt financing offers many forms or structures of financing. Some alternatives for shaping annual debt service obligations include:

- **Level Debt Payments:** Level payments offer the issuer a predictable and consistent debt repayment schedule. Simplicity is a major benefit of level debt payments.
- **Deferred Principal Repayment:** Debt can be structured so that a specified number of payments are interest-only for a given period of time, often the first few years of the repayment schedule. This allows a utility to increase its rate more gradually to generate the necessary amount of revenue, first covering the incremental interest expense and increasing to cover the incremental principal repayment when it begins. While interest-only payments provide a short-term benefit, they come at a cost; a greater amount of interest will be paid over the debt term.
- **Interest Capitalization:** In conjunction with deferred principal payments, a debt issuance can also include capitalized interest. Under this structure, an additional amount would be borrowed. This additional amount would then be used to pay off the interest payments at the beginning of the repayment schedule, such that the first payment made by the issuer will be delayed. While this will reduce the initial burden placed on the utility, the principal amount borrowed will be greater and therefore all proceeding interest and principal payments will also increase. Capitalized interest is often used for large capital projects so that the debt repayment schedule coincides with the commencement of operations.
- **Wrapping Debt:** Debt can be structured to consider the repayment schedule of existing debt. For example, a utility's new bond issue may be structured with accelerated or decelerated repayment schedules to fit in with the relative "peaks" and "valleys" of its existing debt repayment schedules. This strategy strives to maintain a relatively stable overall annual debt service burden.
- **Inter-fund Loans:** These loans are simple debt instruments used to meet short-term cash deficiencies in one fund by borrowing cash from another. These loans constitute a cash transfer from one utility to another and, generally, come at a discount to standard debt issuances. However, that being said, the City requires that inter-fund loans be assessed an interest rate equal to a market rate and precludes it from charging the borrowing fund a significantly lower interest rate. Additionally, inter-fund loans are often repaid over a shorter time period, generally one year or less, than external bonds or loans. Consequently, inter-fund loans are most appropriately used as an interim funding source, with the repayment cost rolled into external debt issuance as needed

After discussions with City staff, the City expects to continue its practice of evaluating the pros and cons of each type of debt near the time of issuance. It is important to note that each debt issuance is unique, often requiring different debt structures over different periods of repayment.

B.1.b Debt Coverage

The City has a number of outstanding bonds, each with its own debt coverage requirement. Historically, the City's high credit rating and use of MPC bonds has reduced borrowing costs and lowered coverage requirements.[4] In addition to being a criterion for complying with debt requirements, the realized coverage ratio is an important statistic used to rate a utility's financial integrity and its ability to meet its debt obligations. While the official bond offering documents will specify the required security provisions, many cities and agencies set higher coverage ratios by policy to retain or attain a higher bong rating and achieve lower interest costs. Furthermore, by setting higher coverage ratios revenue generated may be used for capital purposes, and may reduce the amount of revenue needed to meet cash funded capital needs in the future.

Maintaining a healthy coverage ratio not only eases a utility's ability to make required debt service payments, but also leads to a stronger debt-to-equity ratio. A strong debt-to-equity ratio further serves as a signal to financial institutions that a utility is in good financial standing, and facilitates access to lower interest rates when that utility issues new debt.

As noted earlier, the City has maintained a bond coverage ratio target higher than 1.2 times all utility debt service requirement established by its bond covenants. The City will continue to ensure that the minimum debt coverage factor is maintained. Reducing the target debt coverage factor to the minimum keeps with the City's policy of maintaining its high credit rating while keeping rates low for its utility customers.

C. DEFINING REVENUE NEEDS

The City operates under an enterprise business model where operations do not yield a profit above its needs. Additionally, the water and water reclamation utilities are treated as separate and distinct enterprise funds; each utility's revenues and expenditures are accounted for separately in their own self balancing set of accounts.

That being said, what is an appropriate level for annual revenues? The aforementioned "cash flow" and "bond coverage" tests are commonly used to determine the amount of annual revenue that must be generated from utility rates. Generally speaking, this analysis establishes rate revenue levels that are sufficient to satisfy both tests (assuming the validity of the underlying cost and revenue projections).

[4] A higher credit rating conveys an entity with strong financial operations and therefore a reduced chance of default. MPC bonds are backed by revenues from excise taxes although in practice utility revenues are used for debt service payments. These revenues reflect the borrower's ability of repayment which further reduces the borrowing costs. Lastly, a matter of convention, MPCs often carry lower coverage requirements than revenue bonds – it is important to note that this convention is not without merit, the above stated reasons for lower borrowing costs also relate to coverage requirements.

C.1 Cash Flow Sufficiency Test

The cash flow sufficiency test defines the amount of annual revenues that must be collected in order to meet annual expenditure obligations of the utility. These needs can include but are not limited to cash expenditures for operations, debt service costs, and rate-funded capital. In addition to cash expenditures, non-cash expenses such as depreciation may also be included as an expense that requires adequate cash flow to be funded. The cash flow obligations of the utilities include:

- Operating , maintenance, and various non-operating expenses
- Debt service payments
- Rate-funded capital expenditures
- Reserve funding
- Rate-funded system reinvestment

Offsetting these cash flow obligations are various resources, most notably:

- Customer rate revenues
- Miscellaneous operating and non-operating revenues
- Development fee revenues used for debt service[5]
- Use of existing fund balances

The result of the cash flow sufficiency test is defining the amount of rate revenues needed to meet the utilities' cash flow needs. Rates are set to generate sufficient revenue to cover cash flow for two reasons: (1) they are the utility's primary and most stable source of controllable revenue, (2) other revenue sources are typically limited by either external constraints, scale, or subject to significant annual fluctuations and are not reliable sources of revenue.

C.2 Debt Service Coverage Test

The debt service coverage test is necessary because when an agency issues debt it agrees to certain terms and conditions in relation to the repayment of the debt. Debt coverage is often one of these stipulations, requiring that the agency generate "net revenues" at a level sufficient to cover a defined multiple of annual debt service payments.

Although a majority of the City's debt requires a relatively low debt coverage ratio, it has been City goal to maintain a debt coverage ratio higher than 1.2x. Maintaining the high coverage ratio has earned the City a AAA credit rating by all three rating agencies on existing Revenue Bonds, a Moody's Aa1 credit rating and a AAA credit rating by Fitch and Standard & Poor's on existing MPC bonds (AAA is the highest credit rating given). As part of this study it was discussed and agreed upon with City staff that the future bond coverage target will at a minimum be equal to the 1.2x requirement in order to mitigate the need for rate increases in the future.

[5] Currently the City's policy is to use 50% of its development fee revenues to help fund annual debt service payments and the remaining 50% to fund capital projects.

SECTION III: WATER UTILITY

The City's water utility provides potable water to its customers through the conjunctive use of three main supply sources: groundwater from wells that it owns and surface water that it receives through the Central Arizona Project (CAP) and Salt River Project (SRP). With respect to its groundwater supply, treatment costs have been increasing to reflect the need to comply with evolving regulatory water quality standards and historical depletion of regional groundwater supplies. With respect to its surface water supply, the wholesale rates applicable to the City have been increasing to reflect the cost of operating and maintaining the regional supply systems. A significant portion of the water utility's capital needs are associated with improving and maintaining the City's distribution and treatment capacity.

The rate analysis also addresses recent demand trends that suggest that the per capita water usage has been declining over time. This finding is likely due to a combination of factors including impacts from conservation-oriented pricing and customer education, impacts from the economic recession, and efficiency gains in water use associated with newer fixtures. While this trend may serve the utility in the long-term by allowing it to defer costly improvements in capacity expansion, it poses near-term challenges in that water sales and associated revenues are down. Given that the utility's costs are largely fixed, it would be prudent for the City to consider expected reductions in water sales when establishing rate revenue levels and setting rates.

The key aspects of the water utility revenue requirement analysis are discussed in further detail below.

A. CAPITAL PLAN

Exhibit 5 summarizes the projected capital investment needs of the water utility over the next ten years, based on the most recent CIP provided by City staff:

Exhibit 5: Projected Water Utility Capital Costs ($ Millions)

[Stacked bar graph showing annual CIP expenditures, separated between AMP/other projects]

The forecast of capital costs shown in **Exhibit 5** reflects adjustments for construction cost inflation (between 3% and 5% per year) and a decision by City staff to defer some Asset Management Plan (AMP) projects until FY 2016/17. As shown in **Exhibit 5**, AMP projects represent a significant capital investment need beyond the current near-term CIP planning period.

As previously discussed, the City funds its utility capital projects through a combination of debt and "pay-as-you-go" (non-debt) sources. **Exhibit 6** summarizes the capital funding strategy assumed for the revenue requirement analysis:

Exhibit 6: Planned Capital Funding Strategy

[Stacked bar graph showing annual CIP expenditures by anticipated funding source]

The capital funding strategy shown in **Exhibit 6** indicates a plan to use about $40.6 million in debt proceeds (corresponding to a total of about $46.1 million in total debt issuance) to fund capital projects over the next ten years, representing about 11% of the total projected capital expenditures. This debt issuance is projected to increase the water utility's annual debt service by approximately $3.3 million. The remainder will be funded through a combination of pay-as-you-go sources. The "special funds" referenced in **Exhibit 6** include the Reclaimed Water Distribution System (RWDS) Fund, the Irrigation Water Distribution System (IWDS) Fund, and the West World Fund – these special-purpose funds reimburse the water utility for their allocated share costs, including operating and maintenance, and capital improvements (as determined by City staff).

The most significant pay-as-you-go funding sources shown in **Exhibit 6** are cash balances in the CIP Fund and Replacement & Extension Reserve. In the case of the CIP Fund, the cash balances come from a blend of existing cash balances, projected interest earnings, and transfers of operating income in excess of operating expenses from the Operating Fund. In the case of the Replacement & Extension Reserve, the cash balances come primarily from the projected operating transfers for system reinvestment funding – the existing balances in this reserve are consistent with the minimum balance requirement (2% of the value of tangible assets), and are assumed to be retained to avoid triggering the replenishment provision included in the City's bond indenture requirements (if the balance falls below the target level, rates must fund a transfer equal to 2% of net revenues to the Replacement & Extension Reserve).

B. O&M FORECAST

The O&M forecast is initially based on the City's most recent operating budget, with additional input from City staff regarding anticipated changes in costs. Future-year cost projections were developed based on the following economic assumptions:

- **General Cost Inflation:** General cost inflation applies to most operating expenses. Consistent with the City's existing financial plan, the forecast assumes an initial general inflation rate of 2.5% per year (based on current economic conditions), increasing to 3.0% in FY 2016/17 and subsequent years.
- **Labor Cost Inflation:** Labor cost inflation was established to account for the fact that labor costs generally increase more rapidly than other costs especially if benefit costs are grouped together with salaries. This escalator is applied to labor-related expenses such as salaries. This analysis assumes a labor inflation rate of 3.0% for the entire forecast period.
- **Chemical Cost Inflation:** Because chemical costs are often a large operating cost for utilities, it is important to track and forecast these costs as accurately as possible. Additionally, because chemicals are often derivatives of natural commodities or from scarce sources of supply, chemical costs tend to rise faster than other costs. For these reasons chemical costs are forecasted with their own unique escalator that is higher than construction, labor, and general cost inflation rates. Based on input from City staff, this analysis assumes that chemical costs increase at a rate of 8.0% per year from FY 2011/12 through FY 2015/16 and 5.0% per year thereafter.
- **Customer Growth:** Customer growth assumptions are essential in forecasting customer counts, demand, revenues, and certain operating costs. Given recent experience and the context that the City is relatively built out, this analysis assumes relatively modest customer growth. The average annual customer growth rate over the entire forecast period is assumed to be 0.77%.

- **Customer Water Demand:** To reflect recently observed declines in per capita water demand, this analysis accounts for growth in water demand separately from growth in the number of customers served by the City. Aggregate water demand is assumed to remain constant over the forecast period, despite the fact that the number of customers is assumed to grow slightly.
- **General Cost Inflation plus Growth:** It is worth noting that there are certain variable operating expenses (such as power for pumping) that increase with both cost inflation (the cost per unit of water pumped) and growth (the number of units of water pumped).

While these escalators form the basis for forecasting most operating expenses, there are several expenses that are forecasted differently:

- City staff developed a forecast of water purchase costs that accounts for the complexities of managing a supply system (e.g. optimizing the conjunctive use of various supply sources). This analysis treats the City's forecast as a direct "input," rather than trying to forecast the utilization of supply sources (and related costs) separately.
- The City charges a franchise fee on its utilities equal to 5% of operating revenues. This expense effectively increases at the "aggregate revenue growth rate," and is calculated based on projected revenues (reflecting planned rate adjustments).
- The City also charges the utilities a fee in lieu of property taxes, which the utilities then pass on to customers via rates. As outlined in the City's financial plan and operating budget, this fee is currently being phased out and projected to discontinue after FY 2011/12.

It is worth noting that the operating expense forecast reflects the City's allocation of indirect costs to each of the utilities. This analysis does not derive this allocation directly, but uses an operating budget provided by City staff that reflects the indirect cost allocations.

C. Revenue Requirement Results

Exhibit 7 summarizes the forecast of water utility revenue requirements before rate adjustments:

Exhibit 7: Revenue Requirement Forecast Summary

[Stacked bar graph showing revenue requirement components (e.g. O&M, debt service), with a line showing revenue at existing rates]

Exhibit 7 shows that projected water rate revenues at current rates are sufficient to cover O&M and debt service costs, and would be able to do so for about the next ten years. It is relatively easy to justify these existing rates levels by considering capital needs. Based on a system reinvestment policy that phases in annual transfers equal to the (original-cost) depreciation of water system assets, the City would transfer about $9 million per year to the Replacement & Extension Reserve. As shown in **Exhibit 6**, this provides a substantial amount of funding for capital projects – absent this system reinvestment policy (and transfers of operating cash in excess of operating expenditures to the CIP Fund) rates would likely have to fund substantial investments in infrastructure. Even with the system reinvestment policy (which is intended to stabilize the annual capital funding provision included in rates) and transfers, **Exhibit 7** shows water rates funding about $12.9 million in capital costs between FY 2018/19 and FY 2019/20. At this point, the City could choose to either raise rates to absorb this impact (which would create even greater cash transfers in subsequent years), issue debt to mitigate the cost impacts, or defer capital projects to years where additional cash funding is available.

It is worth noting that the current cash balances are due in part to the City's historical policy of minimizing debt issuance and cash-funding most projects. This policy contributes to the City's strong debt-to-asset ratios and high bond ratings, but requires the City to maintain cash balances to manage the cash flow needs of its capital program. Given the significant capital needs of the City's water utility, the balance of cash vs. debt funding for capital projects is a core policy decision that significantly impacts the need for rate revenue and cash balances. Most utilities maintain a long-term policy to keep the amount of debt outstanding within 40 – 60% of the cost of assets, as excessively high levels of debt can adversely impact the utility. Based on information in the City's 2010 Comprehensive Annual Financial Report (CAFR), the City's outstanding debt principal is about 28% - consequently, the City has considerable room to utilize debt financing without significantly compromising the financial status of its utilities.

Exhibit 8 summarizes the planned water rate revenue strategy:

Exhibit 8: Water Rate Revenue Strategy

[Line graph showing smoothed and raw forecasts of revenue adjustments]

Exhibit 8 shows two rate strategies: a "raw" strategy based on projected needs from year to year, and a "smoothed" strategy that aims for a relatively stable and predictable set of rate adjustments. In summary, the smoothed (recommended) strategy keeps water rate revenues at existing levels through FY 2013/14, transferring the available cash balances to the CIP Fund to manage upcoming capital cash flow needs. From FY 2014/15 through FY 2019/20, water rates are increased by 3.0% to 4.0% every two years to ramp up toward the additional capital funding needs discussed above. These planned rate adjustments generally comply with the City's policy goal of keeping utility rate adjustments at or below inflation.

D. COST-OF-SERVICE ANALYSIS

The cost-of-service analysis is a key component of any rate study and provides a utility with quantifiable support that rates are indeed recovering costs equitably from customers based on the cost of providing service to them. The term "cost-of-service" is used to describe the fact that utilities are required to charge rates based on underlying costs as an equitable basis, while recovering revenues sufficient to meet costs and operate and maintain a healthy financial position.

The cost-of-service analysis uses a methodology consistent with the rate methodology established by the American Water Works Association:

- Costs are first allocated between functions of service. This allocation generally requires a functional allocation of system assets.
- The costs assigned to each function of service are then allocated between defined customer classes based on the demands they impose on the system. This allocation requires the development of a "snapshot" of the customer base (projected customer counts and demands in the year for which rates are being designed).
- The costs allocated to each customer class form the basis for designing applicable rates, based on the projected customer counts and demands.

D.1 Customer Data Analysis

The customer data analysis provides the basis by which costs can be allocated to effectively recover costs from the various customer classes. The analysis begins by performing a "price out" of the customer data provided by the City. The price out is used to calibrate the customer statistics used in the analysis, adjusting them so that they generate revenues that are consistent with actual reported revenues when the corresponding rate structure is applied to them.

The City provided detailed records of monthly water usage by account during FY 2009/10. Applying the FY 2009/10 water rate structure to these statistics produced a rate revenue estimate of $87.4 million, compared to actual reported water rate revenues of $86.4 million. To reconcile with the reported revenues, the customer statistics were adjusted downward by about 1.2%. Once the FY 2009/10 customer data was calibrated, future-year customer counts and demands were forecasted using the assumed customer growth and demand growth rates discussed in the O&M forecast.

D.2 Functional Cost Allocation

As mentioned earlier, the cost-of-service analysis initially allocates the revenue requirement between functions of service. This allocation relies on an allocation of water system assets (treatment facilities, storage tanks, distribution mains, etc.) between the defined functions of service. With respect to the various line items that comprise the revenue requirement, the following principles guided the functional cost allocation:

- Costs related to treatment, supply, and pumping were split between base capacity and peak capacity based on the planning assumptions identified on Page 2-5 of the 2008 Integrated Water Master Plan (about 52% to base capacity, 48% to peak capacity).
- A relatively small portion of costs associated with mains (10%) were allocated to customer based on the assumption that the utility incurs costs maintaining localized mains and service lines. The remainder of these costs were split between base and peak capacity based on the planning assumptions identified on Page 2-5 of the 2008 Integrated Water Master Plan.
- Costs related to utility billing and remittance processing were fully allocated to customer.
- Other direct operating costs and capital costs recovered through rates were allocated between functions of service based on the functional allocation of system assets.
- Indirect costs and reserve funding were allocated as "all other" expenses, being reallocated across the functions of service based on the allocation of the other expenses described above.

In addition to allocating costs across the functional constituents, costs were also allocated between the fixed and variable charge components of the rate structure. In general, the fixed-charge cost basis includes costs associated with utility billing and the capital component of the revenue requirement (including debt service, system reinvestment funding, and other rate-funded capital outlays); other costs are assigned to the variable-charge cost basis. It is worth noting that although the majority of the water utility's costs are fixed (and could justifiably be recovered through fixed charges); the City's policy goal of encouraging efficient water use requires a substantive allocation of costs to volumetric charges. **Exhibit 9** summarizes the revenue requirement functional allocation.

Exhibit 9: Functional Allocation of FY 2011/12 Revenue Requirement

[Pie charts showing allocation to functions of service and fixed/variable charges]

As shown in **Exhibit 9**, the majority of the water utility's revenue requirement is associated with providing capacity to meet average and peak demands. The split of costs between base capacity and peak capacity is roughly equal, and appears to be reasonable given the City's Water Master Plan identifies a planning assumption that maximum-hour demand is 1.925 times average-day demand[6]. Put differently, the planning assumptions suggest that about 52% of the water utility's capacity is needed to meet average demands; the remaining 48% is needed to meet peak demands.

With respect to the allocation of costs between fixed and variable charges, it is worth noting that the FY 2009/10 price out suggests that the existing structure recovers about 27% of the revenue requirement through fixed charges. **Exhibit 9** shows an increase in this percentage to 32%, which is reasonable to expect with the introduction of system reinvestment funding as an explicit rate-funded capital cost.

D.3 Customer Class Cost Allocation

The customer class cost allocation involves distributing costs between defined customer classes based on the relative demands that they place on the water system. For the purpose of this allocation, the analysis groups customers into one of three categories:

- ***Single-Family Residential:*** Including single-family homes and duplexes, this class is known for using relatively little water (per household) during the winter months and peaking significantly during the summer months due to irrigation and other outdoor uses. Based on FY 2009/10 data, this is the City's largest water customer class, accounting for about 83% of all the City's water accounts.
- ***Multi-Family Residential:*** This class includes residential properties with 3 or more living units (e.g. apartment buildings). This class is known for using relatively little water, typically on the order of 70% – 80% of the amount of water that a single-family home would use (per living unit). It is also known to exhibit relatively little peaking in usage during the summer months due to lower irrigation demands. Based on FY 2009/10 data, this class includes roughly 10% of the City's water accounts.
- ***Commercial:*** This class includes all non-residential customers. Though individual customers may vary significantly depending on the type of business activity, in aggregate these customers are known for having relatively high water usage compared to a residential customer with an identical water meter. However, these customers also generally exhibit less peaking in their usage.

The following principles guided the allocation of costs to these customer classes:

- Customer costs were allocated to classes based on the number of accounts, reflecting the fact that these costs are attributable to all customers regardless of water usage.

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[6] Per Page 2-5 of the Integrated Water Master Plan, maximum-hour demand is 1.4 times maximum-day demand, which is 1.1 times maximum-month demand (which is 1.25 times average-day demand). This suggests that maximum-hour demand is 1.25 × 1.1 × 1.4 = 1.925 times average-day demand.

- Base capacity costs were allocated to classes based on their annualized winter water usage (water usage between December and February). Data provided by the City suggests that usage during this "winter" period is notably lower than usage during the other months, providing a sound basis for estimating each class' base usage (excluding peak demands).
- Peak capacity costs were allocated to classes based on their "incremental summer water usage," which was calculated as the difference between their actual water usage and their annualized winter water usage. This metric attempts to capture the incremental peak demands that each class imposes on the system above "base" demand levels.
- Fire protection costs were allocated to classes based on the number of meter flow equivalents (MEs). MEs are assigned to each water meter based on size, using a flow equivalency scale developed by the American Water Works Association (AWWA). **Exhibit 10** summarizes this scale:

Exhibit 10: Meter Flow Equivalency Scale

Meter Size	Number of MEs
5/8"	1.0
3/4"	1.5
1"	2.5
1-1/2"	5.0
2"	8.0
3"	16.0
4"	25.0
6"	50.0
8"	80.0

To address the City's single family residential fire compression requirement this analysis considers all single-family residences to be 1 ME each for the purpose of cost allocations and rate design – other customers are assigned MEs based on the scale shown in **Exhibit 10**. **Exhibit 11** summarizes the allocation of costs to customer classes:

Exhibit 11: Allocation of FY 2011/12 Revenue Requirement to Customer Classes

[Pie Chart with Allocations to Customer Classes: Existing vs. COS]

As shown in **Exhibit 11**, the cost-of-service analysis suggests that a modest shift in cost recovery away from multi-family residential customers would be appropriate. Given that the majority of the revenue requirement is attributed to system capacity and allocated based on demand, this finding appears to be consistent with the "profile" established above for multi-family customers: each living unit uses less water in aggregate than a single-family residence, and in aggregate they exhibit less peaking than other customers.

D.4 Rate Design

Given the cost allocations shown in **Exhibit 11**, the next step is to develop rates that will recover the costs allocated to each class (given the projected statistics used in the cost allocations). FCS GROUP developed several water rate structure alternatives for the City:

- ***Update of Existing Structure:*** This alternative retains the same basic structure as the City's existing water rate structure. It reflects the projected revenue requirement and the allocation of cost recovery between fixed and variable charges, but does not distinguish by class. To be consistent with the underlying cost allocation, it also reflects the change in how MEs are assigned to single-family residences (all single-family residences pay the fixed charge applicable to a 5/8" meter).
- ***Class-Based Structure:*** This alternative is similar to the existing structure, but establishes different fixed and volume charges for each class based on the allocation of costs to customer class shown in **Exhibit 11**.
- ***Class-Based Structure with Uniform Commercial & Multi-Family Volume Rates:*** This alternative is similar to the class-based structure discussed above, but abandons the tiered volume charge structure for commercial and multi-family residential customers. Multi-family residential and non-residential customers pay a single volume rate on all of their usage; the specific volume rate applicable to each class is set to reflect its allocated share of costs. Single-family residences retain the tiered volume charge structure, but the applicable volume thresholds are adjusted to better reflect recent single-family water usage patterns. The upper limit for Block One is increased from 7,500 gallons to 11,500 gallons per month (based on winter-average water usage for single-family accounts); the upper limit for Block Two is decreased from 39,000 gallons to 23,000 gallons (based on maximum monthly usage for single-family accounts).
- ***Water Budgets for Single-Family:*** This alternative focuses on the single-family residential class, allotting each residence a certain amount of water usage based on the lot size. Similarly to the existing structure, this alternative includes a fixed charge (based on lot size rather than meter size) and a four-tiered volume charge structure (with thresholds based on lot size). Generally speaking,
  - The upper limit for the first tier is set based on winter average water use as a representation of "base" indoor water usage.
  - The upper limit for the second tier is set to include estimated outdoor water usage, which based on industry standards for consumptive use is set to 15% of indoor water usage.
  - The upper limit for the third tier is set at 2.0 times the total estimated indoor plus outdoor water usage. This tier is considered to be the "excess" usage tier.
  - All usage above the upper limit for the third tier falls into the fourth tier, which is subject to a "punitive" rate that intends to encourage efficient water use.

  With respect to this alternative, it is worth noting that the inventory of single-family parcels by lot size may not be accurate. The City would need to verify the accuracy of the available data prior to implementing this structure, which would increase both the cost and time involved. In addition, this analysis does not adjust the rate structure for the number of inhabitants – though such adjustments are commonly integrated into a water-budget structure, City staff deemed that the administrative burden of tracking them for its customers would be too costly.

Exhibit 12 provides a comparison of the pros and cons associated with each of these alternatives:

Exhibit 12: Comparison of Water Rate Structure Alternatives

Alternative	Pros	Cons
Update of Existing Structure	▪ Most consistent with existing structure ▪ Allows tracking of one rate structure for all customers	▪ Retains complexity of tracking volume charge thresholds by meter size
Class-Based Structure	▪ More equitable (reflects class-based cost of service)	▪ Retains complexity of tracking volume charge thresholds by meter size ▪ Requires tracking rate structures for multiple classes
Class-Based Structure with Uniform Commercial & Multi-Family Volume Rates	▪ More equitable (reflects class-based cost of service) ▪ Easier to implement multi-family and commercial volume rates	▪ Less effective at encouraging water conservation for commercial and multi-family customers ▪ Requires tracking rate structures for multiple classes
Water Budgets for Single-Family	▪ More consistent with estimated water demands (compared to meter-size basis	▪ Introduces complexity of tracking volume charge thresholds by lot size ▪ Increases administrative burden (requires additional data)

Exhibit 13 presents the alternative water rate structures developed for FY 2011/12:

Exhibit 13: FY 2011/12 Water Rate Structure Alternatives

[Schedule of rate structure alternatives – may need to be separated into multiple exhibits.]

It is worth noting that the rates shown in **Exhibit 13** reflect an adjustment for price elasticity, which is defined as the percent change in demand divided by the percent change in price. This analysis considers price elasticity to account for the fact that changes in the price of water will influence customer usage patterns. A number of factors (such as available income or the nature of the commodity or service being purchased) can influence price elasticity. Over a longer-term duration, water represents a relatively inelastic commodity given its importance in health and everyday life – in other words, price increases will likely not affect the demand for water as much as they can affect less essential commodities. However, significant short-term price changes do result in customer demand changes.

The customer data that the City provided for FY 2009/10 suggests an elasticity factor of approximately -0.38, which suggests that water sales will decrease by about 0.38% for every 1% increase in price. This is consistent with the industry-standard factor of -0.35, which suggests slightly less sensitivity to changes in price. Given that it is most prudent to rely on long-term trends rather than chasing year-to-year fluctuations, this analysis assumes a price elasticity factor of -0.35. Appendix of this report discusses the specific methodology used to adjust the calculated rates for elasticity impacts in further detail.

In addition to the alternatives presented in **Exhibit 13**, it is worth noting that FCS GROUP considered two other alternatives:

- Existing Structure with Uniform Volume Tiers: This alternative was similar to the updated existing structure, but removed the differential volume tiers by meter size. This structure imposed the same tiers on all customers, which significantly shifted cost recovery to customers with larger meter sizes.
- Class-Based Structure with Seasonal Volume Rates for Commercial & Multi-Family: This alternative was similar to the class-based structures discussed above, but imposed a volume rate on all usage that would vary with the time of year. Usage during the winter months would be charged at one rate; usage during the peak summer months would be subject to another (higher) rate. City staff expressed concern about implementing such a structure due to (a) the administrative task of seasonal rate changes, and (b) due to the public relations issues that would occur when customer bills jump up at the beginning of the summer period. For this reason, FCS GROUP replaced this alternative with one that imposes a uniform volume rate on commercial and multi-family usage.

SECTION IV: WATER RECLAMATION UTILITY

The City's water reclamation utility provides sewer conveyance and treatment service to its customers through the conjunctive use of City-owned treatment facilities and regional facilities owned by the Sub-Regional Operating Group (SROG). While operating costs will logically increase over time due to factors such as inflation and growth, funding anticipated capital needs poses a more significant challenge for the water reclamation utility. In addition to near-term capital needs identified in the City's CIP, the City is planning to embark on major capital rehabilitation projects identified in its Asset Management Plan (AMP).

The key aspects of the water reclamation utility revenue requirement analysis are discussed in further detail below.

A. CAPITAL PLAN

Exhibit 14 summarizes the projected capital investment needs of the water reclamation utility over the next ten years, based on the most recent CIP provided by City staff:

Exhibit 14: Projected Water Reclamation Utility Capital Costs ($ Millions)

[Stacked bar graph showing annual CIP expenditures, separated between AMP/other projects]

The forecast of capital costs shown in **Exhibit 14** reflects adjustments for construction cost inflation (between 3% and 5% per year) and a decision by City staff to defer some AMP projects until FY 2016/17. As shown in **Exhibit 14**, AMP projects represent a significant capital investment need beyond the current near-term CIP planning period.

As previously discussed, the City funds its utility capital projects through a combination of debt and "pay-as-you-go" (non-debt) sources. **Exhibit 15** summarizes the capital funding strategy assumed for the revenue requirement analysis:

Exhibit 15: Planned Capital Funding Strategy

[Stacked bar graph showing annual CIP expenditures by anticipated funding source]

The capital funding strategy shown in **Exhibit 15** indicates a plan to use about $104.3 million in debt proceeds to fund capital projects over the next ten years, representing about 33% of the total projected capital expenditures. This total includes approximately $45.4 million in unspent bond proceeds that the City reported as of July 2010 – with projected interest earnings on that existing balance of proceeds, the analysis projects that the City will need about $58.7 million in additional net proceeds (equating to about $66.7 million in total debt issuance) to fund the costs projected for the next ten years. This debt issuance is projected to increase the water reclamation utility's annual debt

service by approximately $4.7 million. The remainder will be funded through a combination of pay-as-you-go sources. It is worth noting that the capital funding strategy shown in **Exhibit 15** assumes an inter-fund loan of $30 million from the water utility – based on conversations with City staff, this loan is treated more like interim financing as the water reclamation utility is assumed to borrow in FY 2012/13 to repay the loan to the water utility.

The most significant pay-as-you-go funding sources shown in **Exhibit 15** are cash balances in the CIP Fund and Replacement & Extension Reserve, development fees, and water reclamation rates. In the case of the CIP Fund, the cash balances come from a blend of existing cash balances, projected interest earnings, and transfers of operating income in excess of operating expenses from the Operating Fund. In the case of the Replacement & Extension Reserve, the cash balances come primarily from the projected operating transfers for system reinvestment funding – the existing balances in this reserve are consistent with the minimum balance requirement (2% of the value of tangible assets), and are assumed to be retained to avoid triggering the replenishment provision included in the City's bond indenture requirements (if the balance falls below the target level, rates must fund a transfer equal to 2% of net revenues to the Replacement & Extension Reserve). In the forecast, rates begin making direct contributions to fund the CIP in FY 2013/14; this need becomes more significant when the water reclamation utility begins funding more AMP projects in FY 2016/17.

B. O&M FORECAST

The O&M forecast is initially based on the City's most recent operating budget, with additional input from City staff regarding anticipated changes in costs. Future-year cost projections were developed based on the same economic assumptions used for the water rates forecast.

C. Revenue Requirement Results

Exhibit 16 summarizes the forecast of water reclamation utility revenue requirements before rate adjustments:

Exhibit 16: Revenue Requirement Forecast Summary

[Stacked bar graph showing revenue requirement components (e.g. O&M, debt service), with a line showing revenue at existing rates]

Exhibit 16 shows that projected water reclamation rate revenues at current rates are sufficient to cover O&M and debt service costs, and would be able to do so for about the next ten years. It is relatively easy to justify existing rate levels by considering capital needs. Based on a system reinvestment policy that phases in annual transfers equal to the (original-cost) depreciation of water reclamation system assets, the City would transfer about $10 million per year to the Replacement & Extension Reserve – however, given that the water reclamation utility currently generates around $34 million in annual rate revenue, the analysis uses 10% of annual depreciation expense as a benchmark for annual system reinvestment funding. Even with this system reinvestment policy (which is intended to stabilize the annual capital funding provision included in rates) and cash balance transfers, **Exhibit 16** shows water reclamation rates funding about $46.7 million in capital costs between FY 2013/14 and FY 2019/20. At this point, the City could choose to either raise rates to absorb this impact (which would create even greater cash balance transfers in subsequent years),

issue debt to mitigate the cost impacts, or defer capital projects to years where additional cash funding is available.

It is worth noting that the current cash balances are due in part to the City's historical policy of minimizing debt issuance and cash-funding most projects. This policy contributes to the City's strong debt-to-asset ratios and high bond ratings, but requires the City to maintain significant cash balances to manage the cash flow needs of its capital program. Given the significant capital needs of the City's water reclamation utility, the balance of cash vs. debt funding for capital projects is a core policy decision that significantly impacts the need for rate revenue and cash balances. Most utilities maintain a long-term policy to keep the amount of debt outstanding within 40 – 60% of the cost of assets, as excessively high levels of debt can adversely impact the utility. Based on information in the City's 2010 Comprehensive Annual Financial Report (CAFR), the City's outstanding debt principal is about 28% - consequently, the City has considerable room to utilize debt financing without significantly compromising the financial status of its utilities.

Exhibit 17 summarizes the planned water reclamation rate revenue strategy:

Exhibit 17: Water Reclamation Rate Revenue Strategy

[Line graph showing smoothed and raw forecasts of revenue adjustments]

Exhibit 17 shows two rate strategies: a "raw" strategy based on projected needs from year to year, and a "smoothed" strategy that aims for a relatively stable and predictable set of rate adjustments. In summary, the smoothed (recommended) strategy contemplates modest annual rate increases from FY 2011/12 through FY 2013/14, with increased annual rate increases from FY 2014/15 through FY 2016/17. This strategy results in near-term cash flow surpluses which provide resources to the CIP Fund to manage upcoming capital cash flow needs. These planned rate adjustments exceed inflation, but are staged to provide relatively smoothed impacts. If the City is able to defer projects or issue debt to fund project costs that would otherwise fall on rates, it may be able to materially improve this forecast.

D. COST-OF-SERVICE ANALYSIS

The cost-of-service analysis is a key component of any rate study, providing a utility with quantifiable support that rates are indeed recovering costs equitably from customers based on the cost of providing service to them. The term "cost-of-service" is used to describe the fact that utilities are required to charge rates based on underlying costs, recovering revenues sufficient to meet costs and operate and maintain a healthy financial position.

The cost-of-service analysis uses a methodology consistent with the rate methodology established by the American Water Works Association:

- Costs are first allocated between functions of service. This allocation generally requires a functional allocation of system assets.
- The costs assigned to each function of service are then allocated between defined customer classes based on the demands they impose on the system. This allocation requires the development of a "snapshot" of the customer base (projected customer counts and demands in the year for which rates are being designed).
- The costs allocated to each customer class form the basis for designing applicable rates, based on the projected customer counts and demands.

D.1 Customer Data Analysis

The customer data analysis provides the basis by which costs can be allocated to effectively recover costs from the various customer classes. The analysis begins by performing a "price out" of the customer data provided by the City. The price out is used to calibrate the customer statistics used in the analysis, adjusting them so that they generate revenues that are consistent with actual reported revenues when the corresponding rate structure is applied to them.

The City provided detailed records of the monthly water reclamation billing basis (90% of December – February water usage) by account during FY 2009/10. Applying the FY 2009/10 water reclamation rate structure to these statistics produced a rate revenue estimate of $33.4 million, compared to actual reported water rate revenues of $34.6 million. To reconcile with the reported revenues, the customer statistics were adjusted upward by about 3.5%. Once the FY 2009/10 customer data was calibrated, future-year customer counts, flows, and loadings were forecasted using the assumed customer growth and flow growth rates discussed in the O&M forecast. **Exhibit 18** summarizes the assumed sewage characteristics for each of the City's current water reclamation classes:

Exhibit 18: Assumed Sewer Characteristics

Class	Average Chemical Oxygen Demand (COD) Loadings	Average Suspended Solids (TSS) Loadings
Single-Family Residential	205 mg/L	220 mg/L
Multi-Family Residential	205 mg/L	220 mg/L
Commercial, Without Dining	130 mg/L	80 mg/L
Commercial, With Dining	210 mg/L	400 mg/L
Hotels/Motels, Without Dining	310 mg/L	120 mg/L
Hotels/Motels, With Dining	500 mg/L	600 mg/L
Car Washes	20 mg/L	150 mg/L
Commercial Laundry	450 mg/L	240 mg/L
Mortuaries	800 mg/L	800 mg/L
Laundromats	150 mg/L	110 mg/L
Metal Platers	130 mg/L	80 mg/L
Restaurants	1,000 mg/L	600 mg/L
Bakeries	1,000 mg/L	600 mg/L
Service Station Auto Repair	180 mg/L	280 mg/L
Medical Institutions	250 mg/L	100 mg/L
Schools	130 mg/L	100 mg/L

The assumed loadings shown in **Exhibit 18** are a product of a survey of a number of utilities (including Orange County Sanitation District and Los Angeles County Sanitation District, among other utilities) with sampling programs that support strength-based water reclamation rate structures. In the event that the City decides to implement a sampling program in the future, it can verify that these assumptions hold reasonably true for its customers (do we have access to data closer to us than Orange County?).

D.2 Functional Cost Allocation

As mentioned earlier, the cost-of-service analysis initially allocates the revenue requirement between functions of service. This allocation relies on an allocation of water reclamation system assets (treatment facilities, trunk lines, etc.) between the defined functions of service. With respect to the various line items that comprise the revenue requirement, the following principles guided the functional cost allocation:

- Costs related to treatment were allocated 40% to flow, 30% to COD, and 30% to TSS based on industry standards.
- Costs related to utility billing and remittance processing were fully allocated to customer.
- Other direct operating costs and capital costs recovered through rates were allocated between functions of service based on the functional allocation of system assets.
- Indirect costs and reserve funding were allocated as "all other" expenses, being reallocated across the functions of service based on the allocation of the other expenses described above.

In addition to allocating costs across the functional constituents, costs were also allocated between the fixed and variable charge components of the rate structure. In general, the fixed-charge cost basis includes costs associated with utility billing and the capital component of the revenue requirement (including debt service, system reinvestment funding, and other rate-funded capital outlays); other costs are assigned to the variable-charge cost basis. **Exhibit 19** summarizes the revenue requirement functional allocation.

Exhibit 19: Functional Allocation of FY 2011/12 Revenue Requirement

[Pie charts showing allocation to functions of service and fixed/variable charges]

As shown in **Exhibit 19**, about 50% of the water reclamation utility's revenue requirement is associated with providing capacity to accommodate flow; about 47% of the revenue requirement is attributed to providing capacity to treat sewage of varying strengths; and 3% represents (FCS to fill in).

D.3 Customer Class Cost Allocation

The customer class cost allocation involves distributing costs between defined customer classes based on the relative demands that they place on the water reclamation system. For the purpose of this allocation, the analysis groups customers into one of three categories:

- ***Single-Family Residential:*** Including single-family homes and duplexes, this class is known for generating relatively small flows (per household) of domestic sewage strength. Based on FY 2009/10 data, this is the City's largest water reclamation customer class, accounting for about 91% of all the City's water reclamation accounts.
- ***Multi-Family Residential:*** This class includes residential properties with 3 or more living units (e.g. apartment buildings). This class is known for generating relatively small flows, typically on the order of 70% – 80% of the amount that a single-family home would generate (per living unit). Based on FY 2009/10 data, this class includes roughly 3% of the City's water reclamation accounts.

- ***Commercial:*** This class includes all non-residential customers. Though individual customers may vary significantly depending on the type of business activity, in aggregate these customers are known for generating larger and stronger (COD and TSS) sewage flows than a single-family home.

The following principles guided the allocation of costs to these customer classes:

- Customer costs were allocated to classes based on the number of accounts, reflecting the fact that these costs are attributable to all customers regardless of usage.
- Flow costs were allocated to classes based on their estimated annual sewage discharge (90% of water usage between December and February).
- COD costs were allocated to classes based on their estimated COD loadings, computed by applying the assumed concentrations shown in **Exhibit 18** to the estimated annual sewage discharge discussed above.
- TSS costs were allocated to classes based on their estimated TSS loadings, computed by applying the assumed concentrations shown in **Exhibit 18** to the estimated annual sewage discharge discussed above.

Exhibit 20 summarizes the allocation of the water reclamation rate revenue requirement to customer classes:

Exhibit 20: Allocation of FY 2011/12 Revenue Requirement to Customer Classes

[Pie Chart with Allocations to Customer Classes: Existing vs. COS]

As shown in **Exhibit 20**, the cost-of-service analysis suggests that the existing rate structure is recovering costs equitably from the City's customers, with a slight shift in cost recovery from single-family residential to commercial customers being appropriate.

D.4 Rate Design

Given the cost allocations shown in **Exhibit 20**, the next step is to develop rates that will recover the costs allocated to each class (given the projected statistics used in the cost allocations). FCS GROUP developed several water reclamation rate structure alternatives for the City:

- ***Update of Existing Structure:*** This alternative retains the same basic structure as the City's existing water reclamation rate structure. It reflects the projected revenue requirement and the allocation of cost recovery between fixed and variable charges, retaining the same structure of classes shown in **Exhibit 18.**
- ***Simplified Class Structure:*** This alternative is similar to the existing structure, but combines all non-residential customers into a single class.
- ***Strength-Based Class Structure:*** This alternative is also similar to the existing structure, but defines classes by sewage strength level rather than customer type. Based on discussions with City staff, it includes five strength classes:
  - Low < 150 mg/L of COD/TSS
  - Medium-Low 150 – 200 mg/L of COD/TSS
  - Medium (Domestic) 200 – 250 mg/L of COD/TSS

- Medium-High 250 – 400 mg/L of COD/TSS
- High > 400 mg/L of COD/TSS

- ***Volumetric Structure with Cap for Single-Family Residences:*** This alternative redefines "estimated sewer flow" as it factors into the rate structure. For classes other than single-family residential, it is defined as 90% of actual water usage (allowing 10% for consumptive use that does not enter the sewer system); for single-family residences, it is defined as 90% of winter-average water usage, where "winter" is defined as December – February (data provided by the City shows that customers use significantly less water during these months compared to the other months of the year). In this alternative, single-family water usage is capped to account for the fact that it includes irrigation use (other classes are assumed to be metered separately for irrigation use and excluded from the water reclamation customer data).

Exhibit 21 provides a comparison of the pros and cons associated with each of these alternatives:

Exhibit 21: Comparison of Water Reclamation Rate Structure Alternatives

Alternative	Pros	Cons
Update of Existing Structure	▪ Most consistent with existing structure	▪ Retains complexity of tracking 16 customer classes
Simplified Class Structure	▪ Simpler to apply than existing structure ▪ Easier to explain/justify classifications	▪ Reduces equity for certain commercial customers (by combining into one class)
Strength-Based Class Structure	▪ More equitable (reflects classes based on sewer strength) ▪ Simpler to apply than existing structure ▪ Easier to explain/justify classifications	▪ Increases need for sampling/monitoring requirements ▪ Greater administrative burden (e.g. appeal process)
Volumetric Structure with Cap for Single-Family Residences	▪ More closely links water and water reclamation bills for customers other than single-family ▪ Eliminate administrative burden of processing seasonal sewer adjustment forms	▪ Introduces seasonality to revenue stream (billing based on actual water usage) ▪ Penalizes businesses with high consumptive water use

Exhibit 22 presents the alternative water rate structures developed for FY 2011/12:

Exhibit 22: FY 2011/12 Water Reclamation Rate Structure Alternatives

[Schedule of rate structure alternatives – may need to be separated into multiple exhibits.]

All of the rate structure alternatives presented in **Exhibit 22** reflects a revised implementation of the minimum charge. Under the existing structure, all customers are subject to a minimum monthly charge of $14.29 (multi-family customers are subject to a minimum charge of $8.90 per living unit) despite having different rate structures in a number of cases. The revised structures base the minimum monthly charge on the winter-average water usage for a single-family residence (9,000 gallons) – with this change, customers with different rate structures will have different minimum charges.

It is worth noting that the rates shown in **Exhibit 22** reflect an adjustment for price elasticity, which is defined as the percent change in demand divided by the percent change in price. This analysis considers price elasticity to account for the fact that changes in volumetric rates will influence customer usage patterns. A number of factors (such as available income or the nature of the commodity or service being purchased) can influence price elasticity. Given the link between water use and sewage flows, price increases will likely not affect the use of water (and generation of sewage flows) as much as they can affect less essential commodities. However, significant short-term price changes do result in customer demand changes.

The customer data that the City provided for FY 2009/10 suggests an elasticity factor of approximately -0.38, which suggests that water usage (and resulting sewage flows) will decrease by about 0.38% for every 1% increase in price. This is consistent with the industry-standard factor of -0.35, which suggests slightly less sensitivity to changes in price. Given that it is most prudent to rely on long-term trends rather than chasing year-to-year fluctuations, this analysis assumes a price elasticity factor of -0.35. Appendix of this report discusses the specific methodology used to adjust the calculated rates for elasticity impacts in further detail.

SECTION V: CONCLUSIONS & RECOMMENDATIONS

[Sample Bill Comparison]

[Conclusions & Recommendations]

[Statistical Data]

Proposed Water and Sewer Rate Changes

Water Sustainability through Stewardship, Innovation and People

Overview

- Adequate revenue in water and sewer for FY13
- Cost of Service Findings
  - Water rate inconsistencies
    - Rates not consistent with conservation goals
    - Inequitable within current tier structures
  - Outdated sewer rate components
    - Biological Oxygen Demand (BOD) vs. Chemical Oxygen Demand (COD)
    - Loadings not current within billing structure

Water Rates

Current Water Rates

Meter Size	Monthly Water Base Fee	Tier 1 Water Usage Fee Per 1,000 Gallons	Tier 1 Maximum Monthly Usage in Gallons	Tier 2 Water Usage Fee Per 1,000 Gallons[1]	Tier 2 Maximum Monthly Usage in Gallons	Tier 3 Water Usage Fee Per 1,000 Gallons[1]
5/8"	$11.55	$1.85	7,500	$3.44	39,000	$4.72
3/4"	$15.93	$1.85	8,300	$3.44	44,000	$4.72
1"	$24.18	$1.85	12,600	$3.44	75,000	$4.72
1 1/2"	$44.41	$1.85	23,100	$3.44	373,000	$4.72
2"	$66.03	$1.85	34,300	$3.44	640,000	$4.72
3"	$115.23	$1.85	60,000	$3.44	2,140,000	$4.72
4"	$177.00	$1.85	92,000	$3.44	5,790,000	$4.72
6"	$329.35	$1.85	171,000	$3.44	6,250,000	$4.72
8"	$485.76	$1.85	252,000	$3.44	6,710,000	$4.72

Notes:

[1] The Tier 2 water usage fee applies to all usage above the Tier 1 maximum up to the Tier 2 maximum. The Tier 3 water usage fee applies to all usage above the Tier 2 maximum.

An environmental water quality charge of 2.677% has been applied to the total water base and usage fees shown above.
A storm water charge of 1.000% has not been applied to the total water base and usage fees shown above.

Proposed Water Rate Structures

Meter Size	Monthly Water Base Fee
5/8"	$10.75
3/4"	$14.00
1"	$20.00
1 1/2"	$25.00
2"	$35.00
3"	$45.00
4"	$100.00
6"	$200.00
8"	$300.00

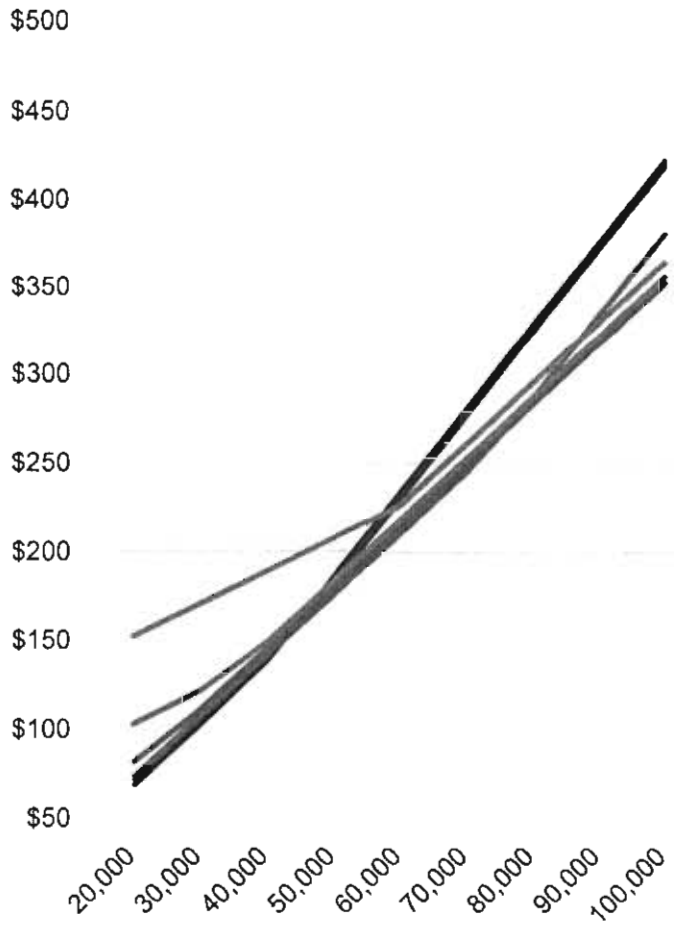
Single Family Residential Rate Structure	
Rate	Tier/Gallons
$1.80	0 - 5,000
$2.90	5,001 - 12,000
$3.50	12,001 - 40,000
$4.50	40,001 - 70,000
$5.00	70,001 and over

Multi Family/Non-Residential Rate Structure	
Rate	Tier/Gallons
$1.80	0 – 2,500
$2.80	2,501 - 6,000
$3.40	6,001 – 20,000
$3.70	20,001 and over

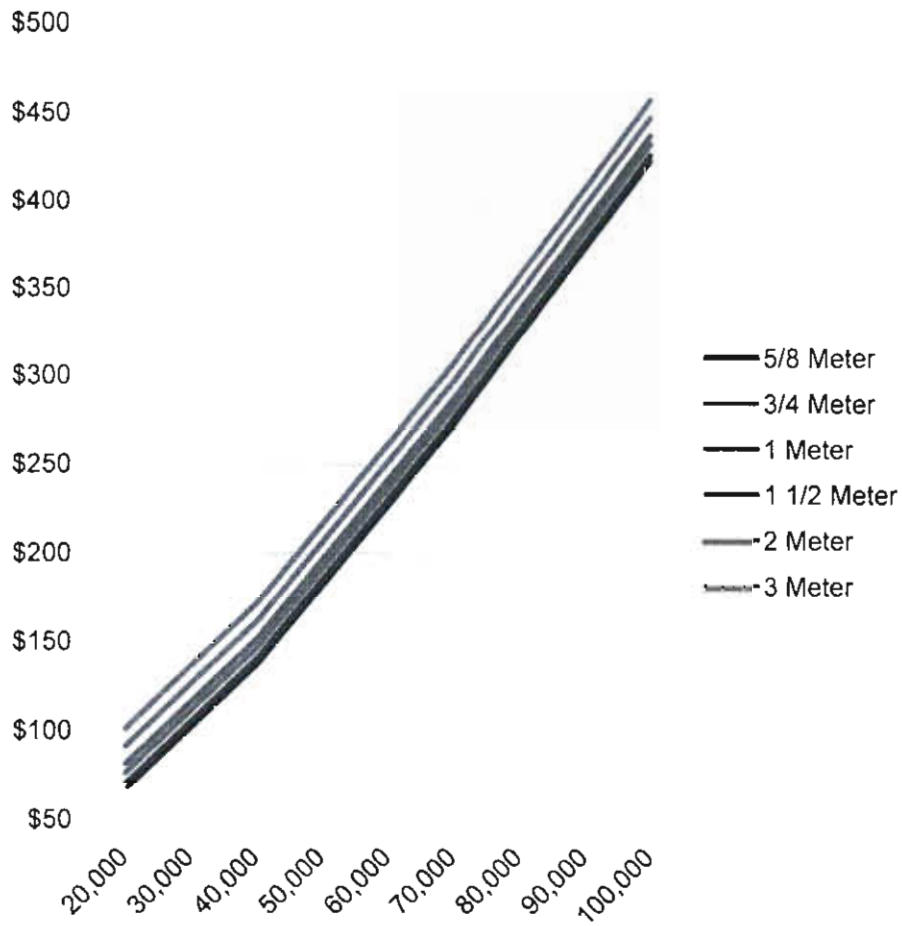
Water Rates – Bill Total

By Meter Size – Residential Customers

Current Rate Structure

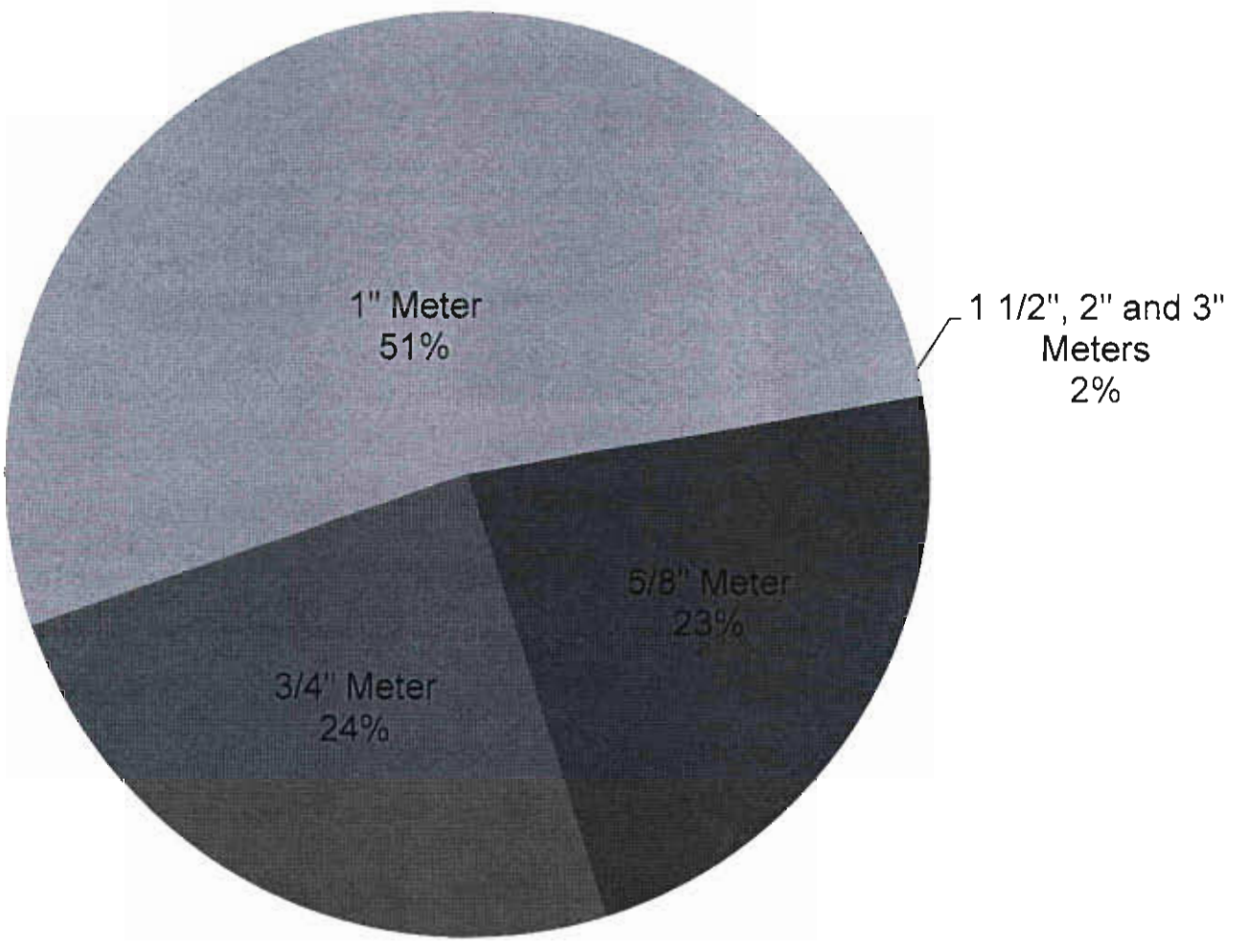


Proposed Rate Structure



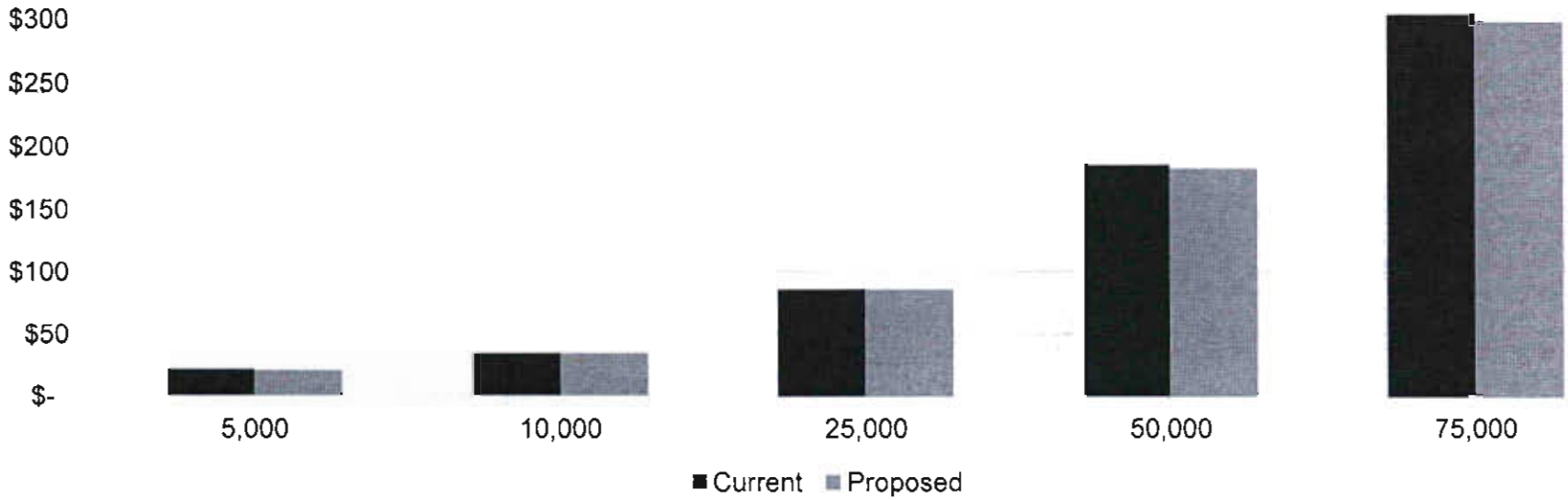
Proposed Water Rates

73,131 Residential Accounts By Meter Size



Proposed Water Rates – Bill

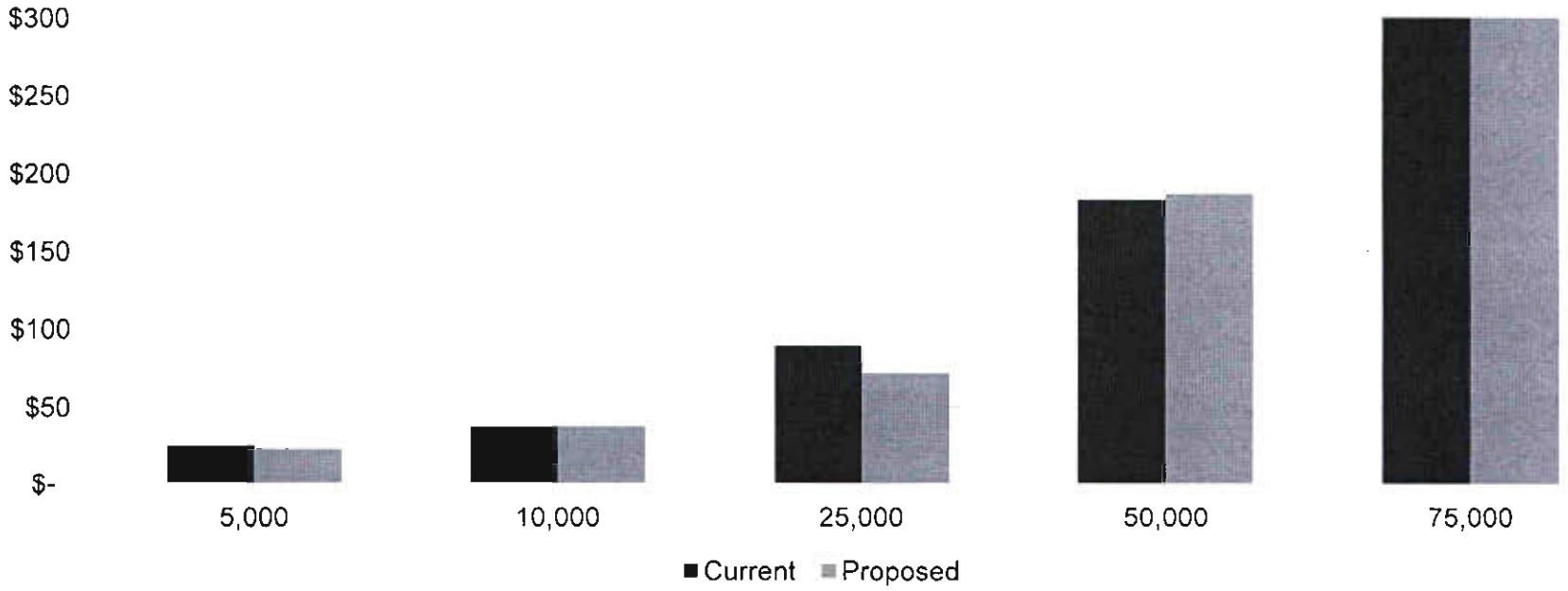
Single Family Residential 5/8" Meter – 16,757 Accounts



	Gallons	Bills	Impact
Tier 1	0 - 5K	34%	Decrease
Tier 2	5K – 12K	37%	Decrease/Increase
Tier 3	12K – 40K	27%	Decrease/Increase
Tier 4	40K – 70K	2%	Decrease
Tier 5	Over 70K	<1%	Na

Proposed Water Rates – Bill

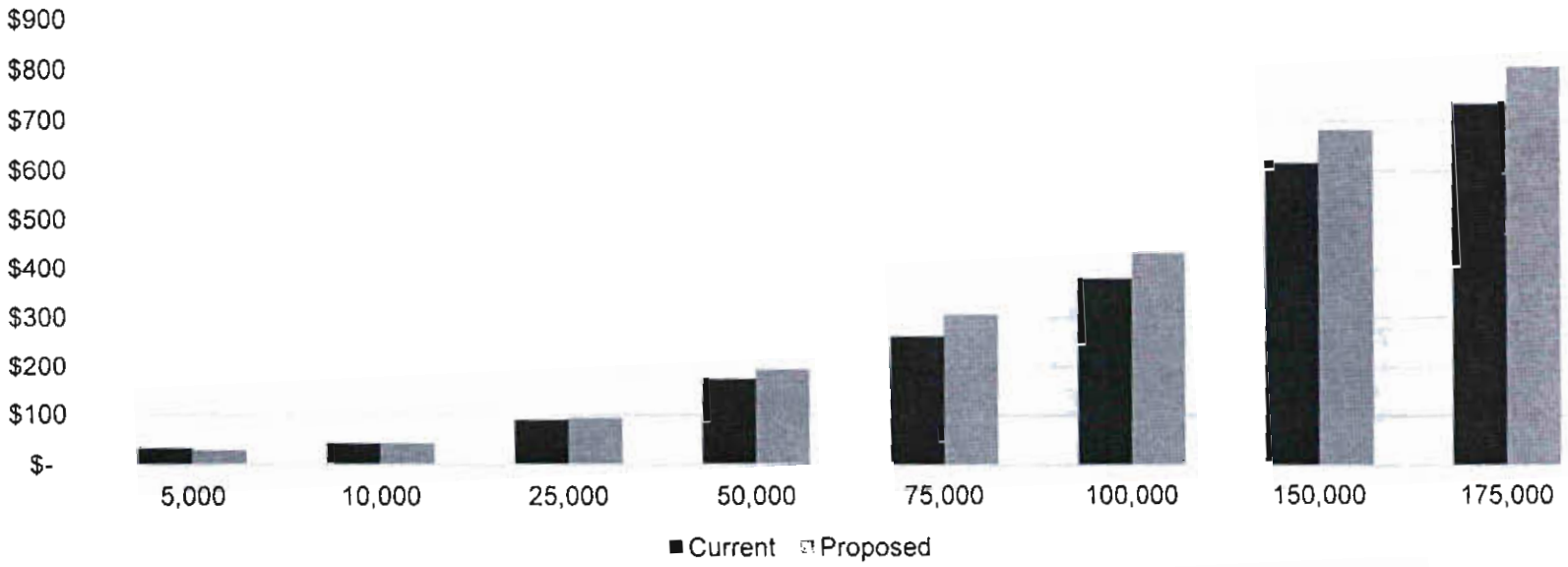
Single Family Residential 3/4" Meter – 17,899 Accounts



	Gallons	Bills	Impact
Tier 1	0 - 5K	31%	Decrease
Tier 2	5K – 12K	35%	Decrease/Increase
Tier 3	12K – 40K	30%	Decrease/Increase
Tier 4	40K – 70K	3%	Decrease/Increase
Tier 5	Over 70K	1%	Increase

Proposed Water Rates – Bill

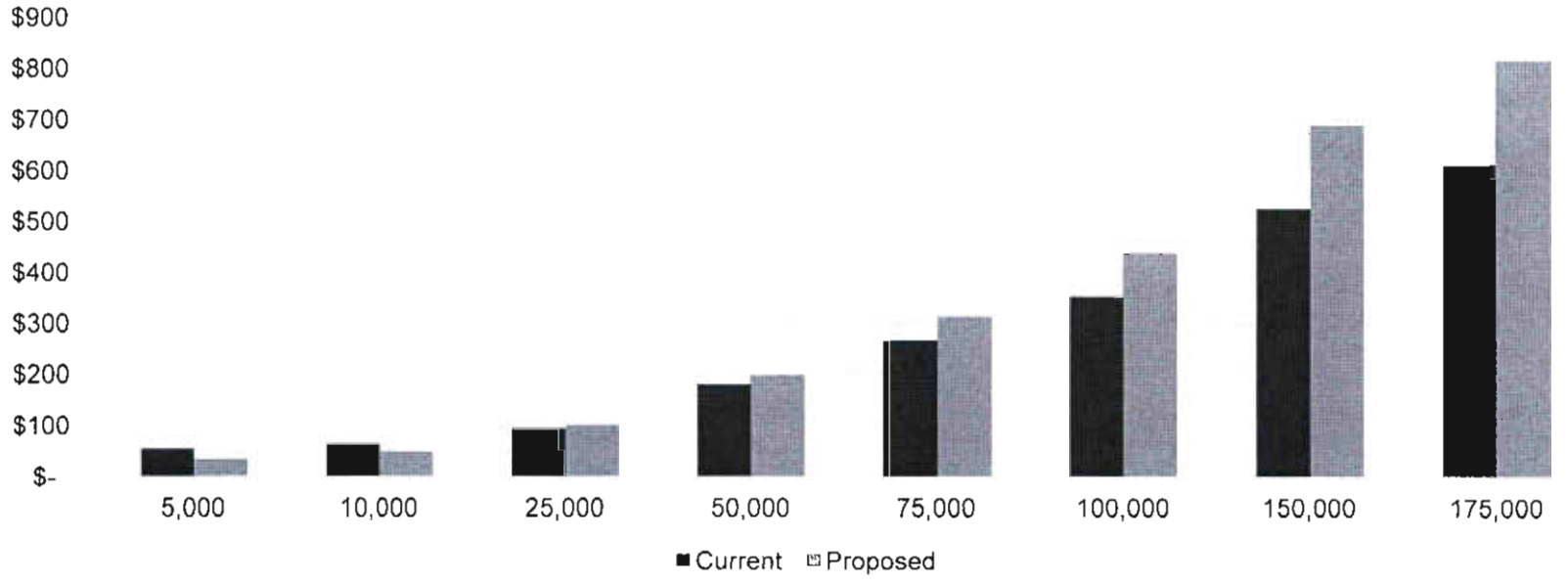
Single Family Residential 1" Meter – 37,087 Accounts



	Gallons	Bills	Impact
Tier 1	0 - 5K	16%	Decrease
Tier 2	5K – 12K	34%	Decrease/Increase
Tier 3	12K – 40K	42%	Increase
Tier 4	40K – 70K	6%	Increase
Tier 5	Over 70K	2%	Increase

Proposed Water Rates – Bill

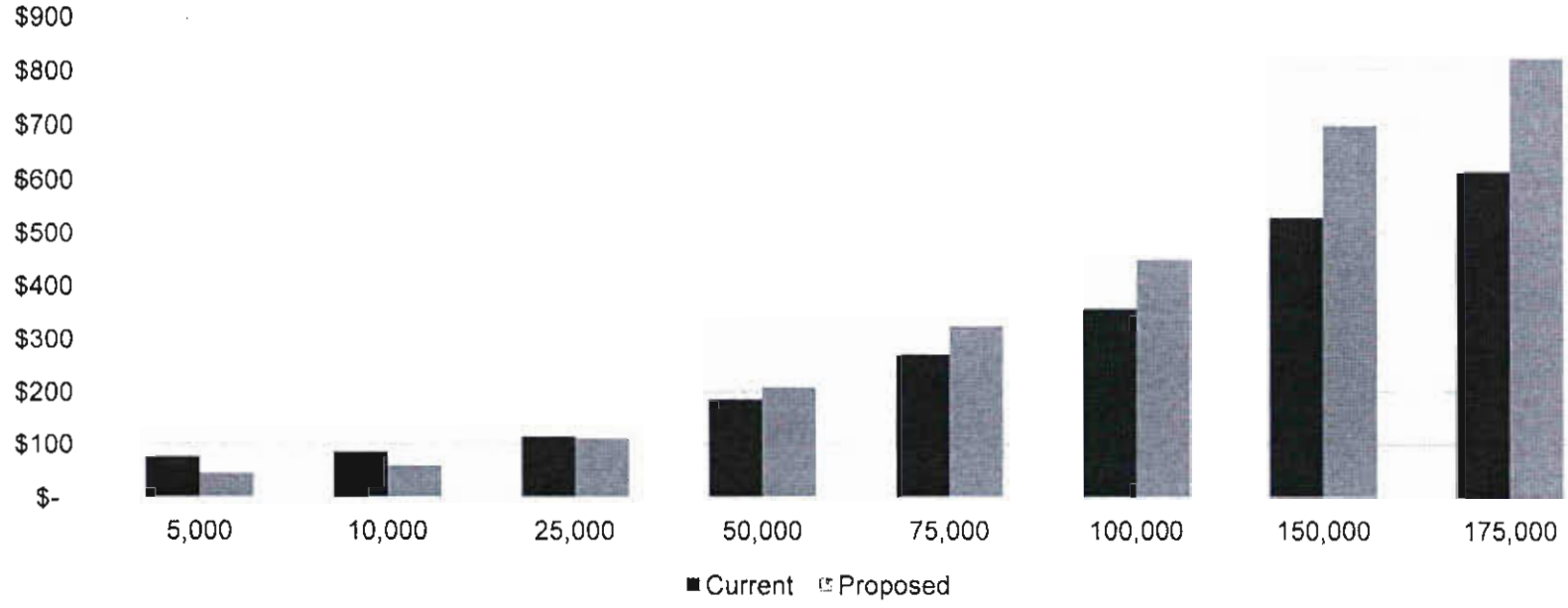
Single Family Residential 1 1/2" Meter – 1,028 Accounts



	Gallons	Bills	Impact
Tier 1	0 - 5K	10%	Decrease
Tier 2	5K – 12K	13%	Decrease
Tier 3	12K – 40K	42%	Decrease/Increase
Tier 4	40K – 70K	20%	Increase
Tier 5	Over 70K	15%	Increase

Proposed Water Rates – Bill

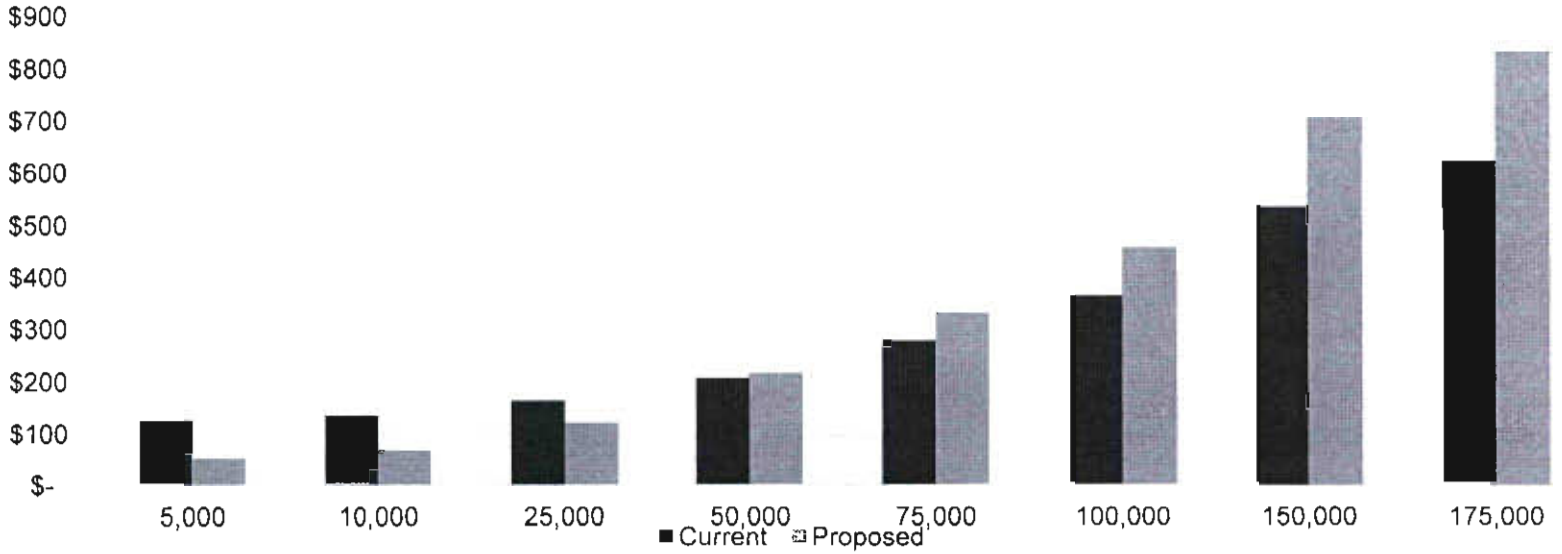
Single Family Residential 2" Meter – 350 Accounts



	Gallons	Bills	Impact
Tier 1	0 - 5K	6%	Decrease
Tier 2	5K – 12K	7%	Decrease
Tier 3	12K – 40K	19%	Decrease/Increase
Tier 4	40K – 70K	21%	Increase
Tier 5	Over 70K	47%	Increase

Proposed Water Rates – Bill

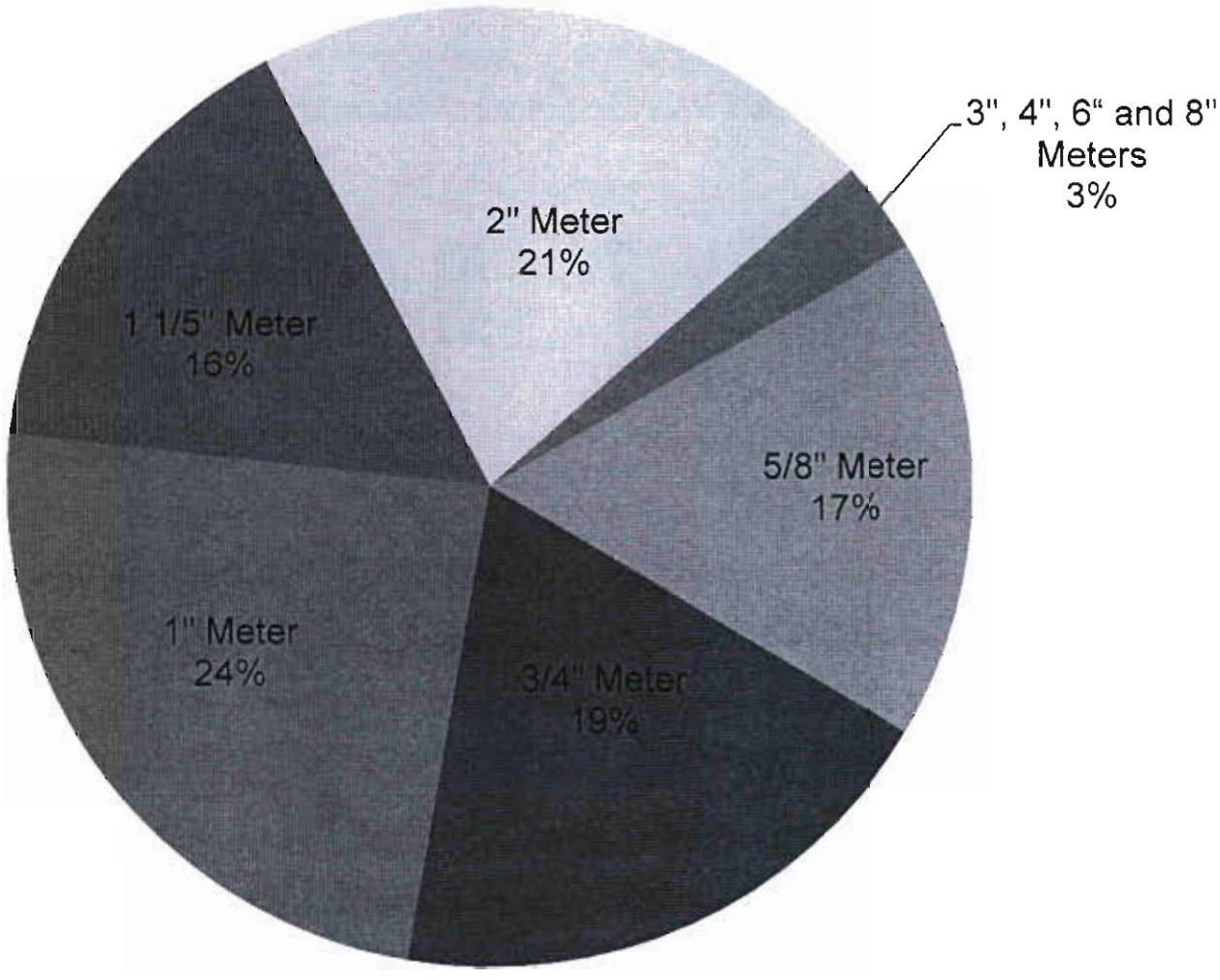
Single Family Residential 3" Meter – 10 Accounts



	Gallons	Bills	Impact
Tier 1	0 - 5K	<1%	Decrease
Tier 2	5K – 12K	<1%	Decrease
Tier 3	12K – 40K	<1%	Decrease
Tier 4	40K – 70K	8%	Decrease/Increase
Tier 5	Over 70K	92%	Increase

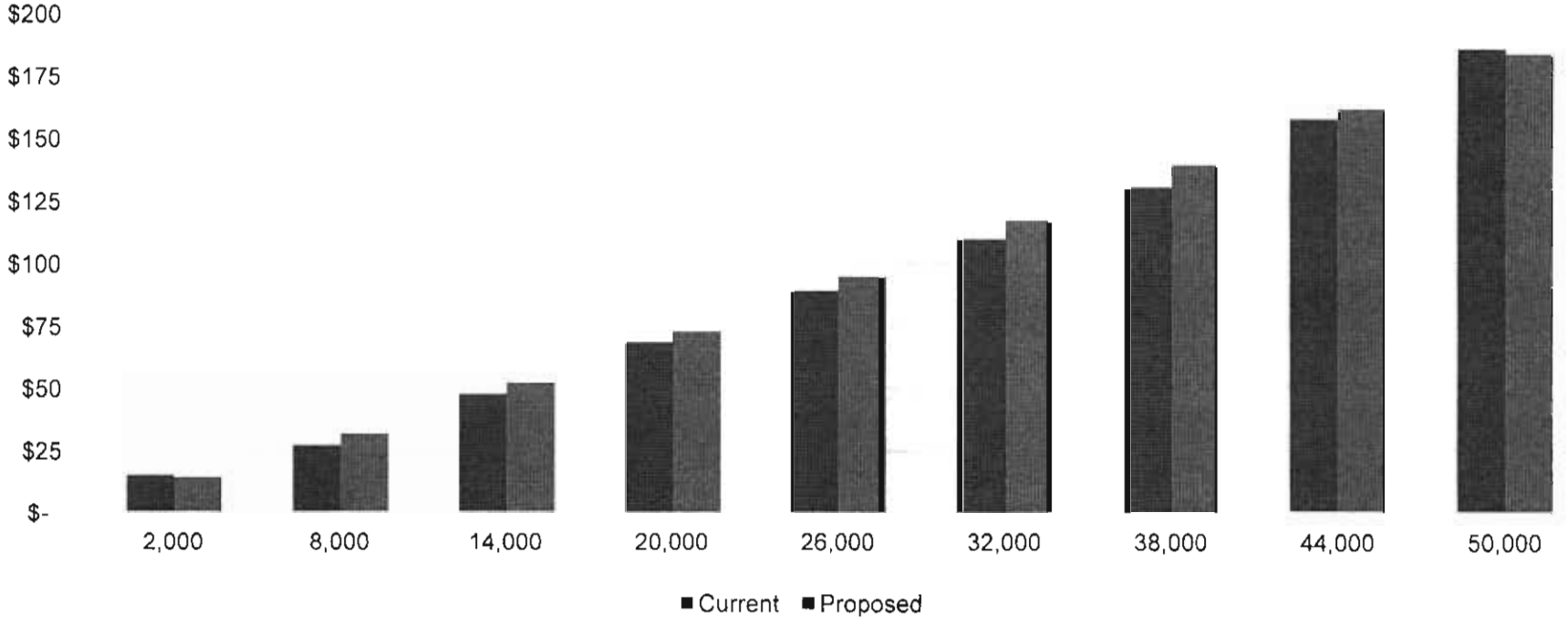
Proposed Water Rates

14,289 Non Residential Accounts By Meter Size



Proposed Water Rates – Bill

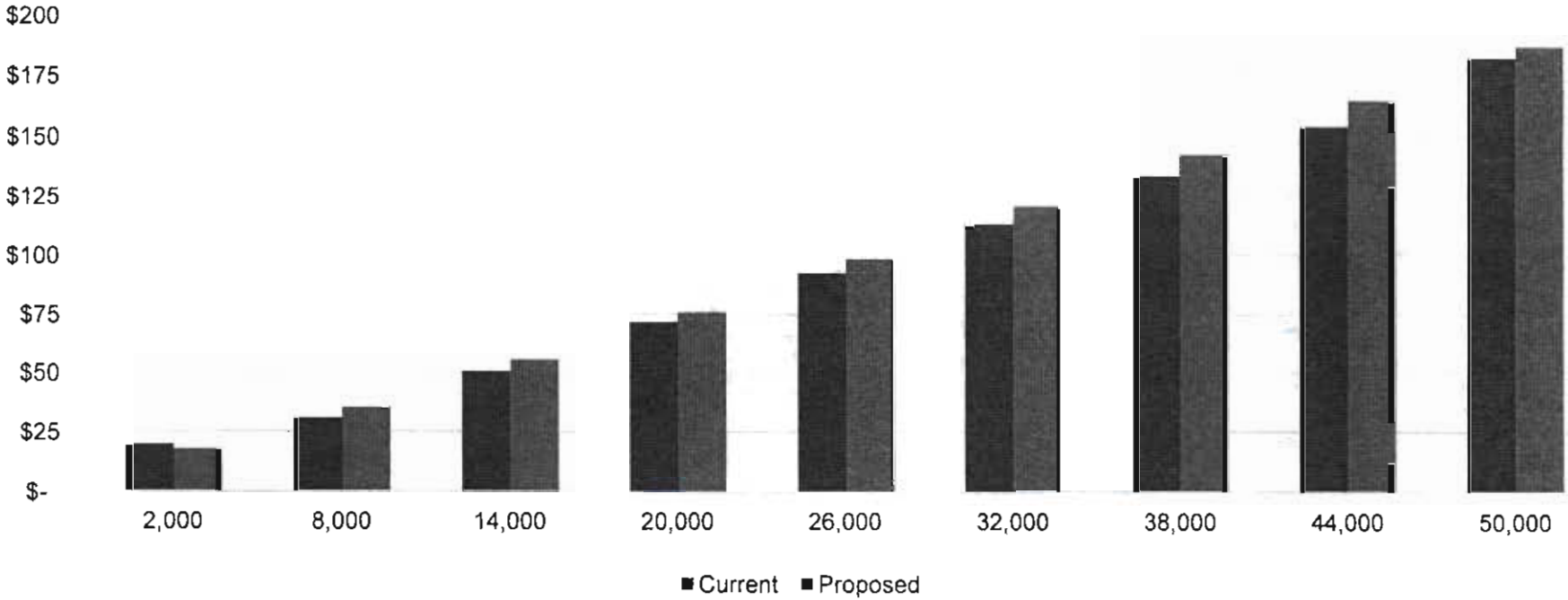
Non Residential 5/8" Meter – 2,411 Accounts



	Gallons	Bills	Impact
Tier 1	0 – 2.5K	34%	Decrease
Tier 2	2.5K – 6.0K	35%	Increase
Tier 3	6.0K – 20.0K	25%	Increase
Tier 4	Over 20.0K	7%	Increase/Decrease

Proposed Water Rates – Bill

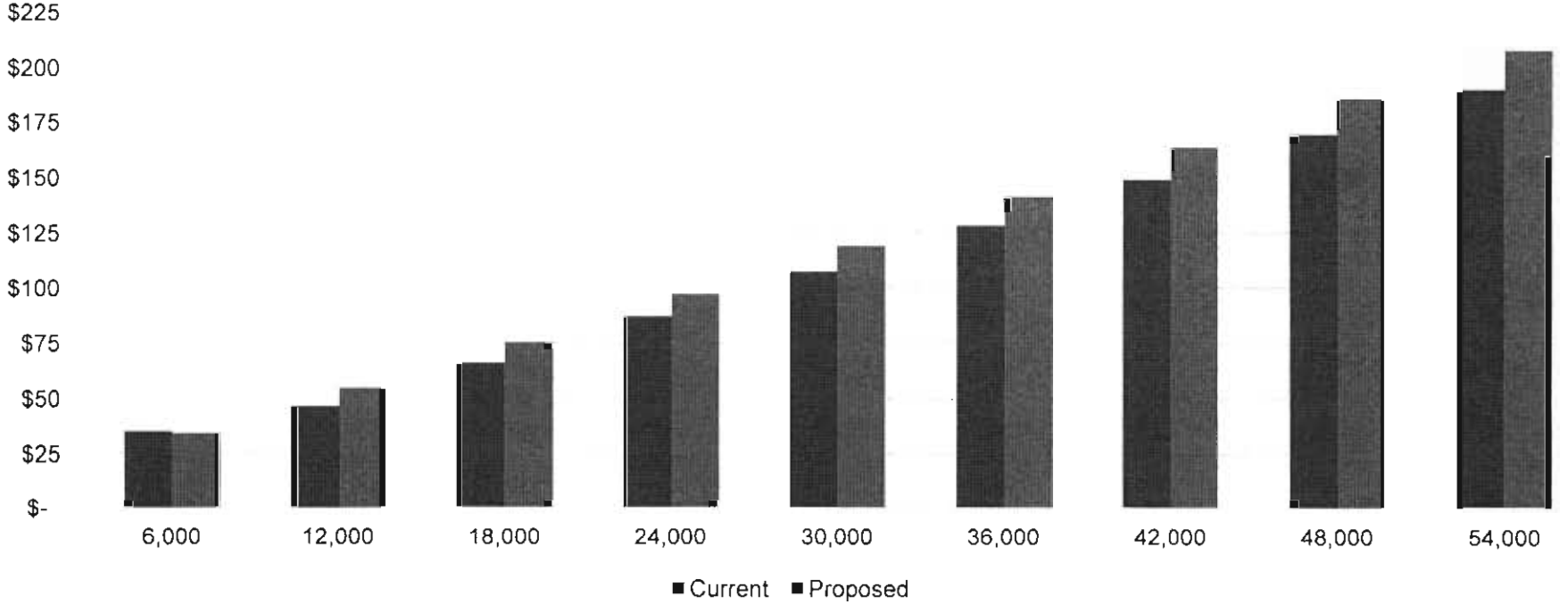
Non Residential 3/4" Meter – 2,750 Accounts



	Gallons	Bills	Impact
Tier 1	0 – 2.5K	40%	Decrease
Tier 2	2.5K – 6.0K	37%	Decrease/Increase
Tier 3	6.0K – 20.0K	20%	Increase
Tier 4	Over 20.0K	3%	Decrease/Increase

Proposed Water Rates – Bill

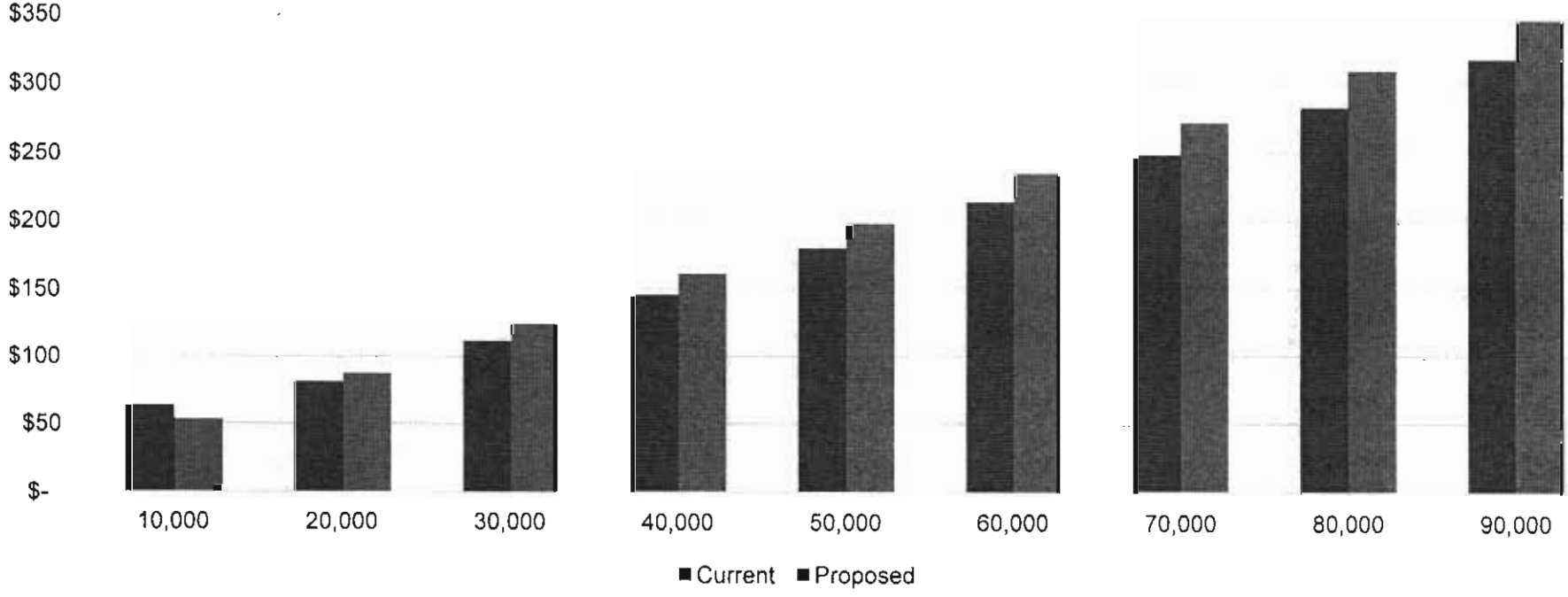
Non Residential 1" Meter – 3,421 Accounts



	Gallons	Bills	Impact
Tier 1	0 – 2.5K	33%	Decrease
Tier 2	2.5K – 6.0K	24%	Decrease/Increase
Tier 3	6.0K – 20.0K	24%	Increase
Tier 4	Over 20.0K	18%	Decrease/Increase

Proposed Water Rates – Bill

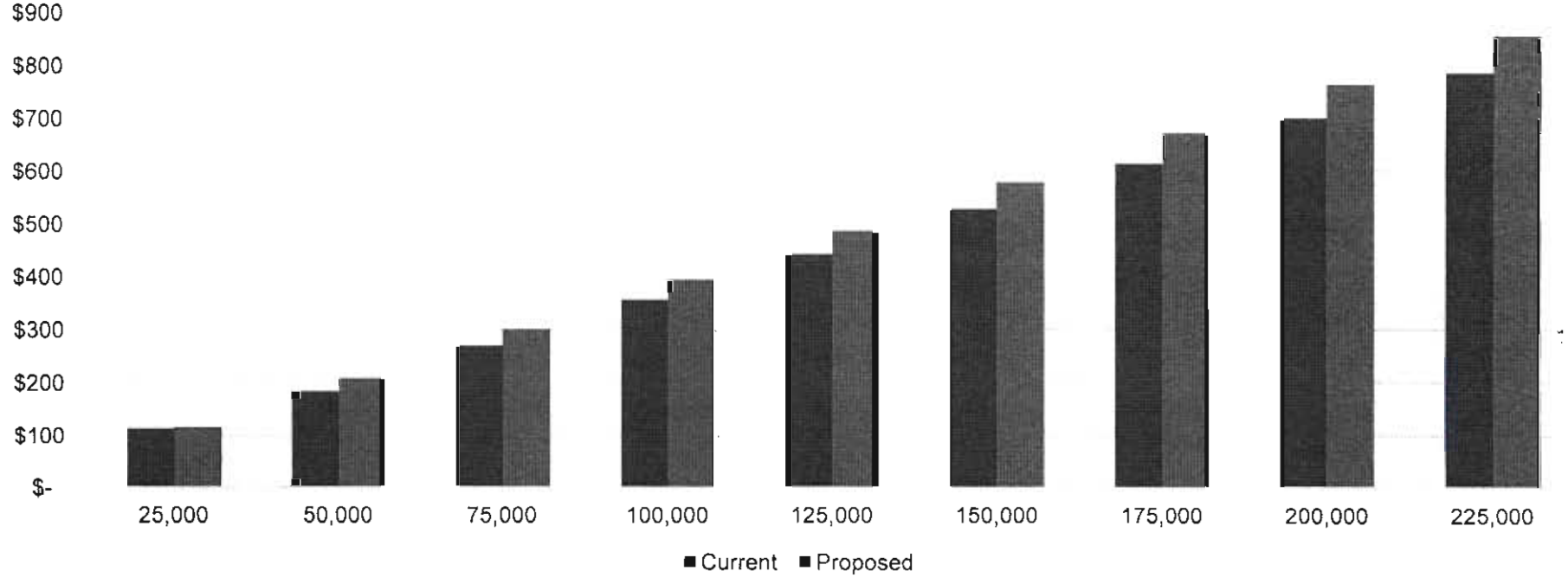
Non Residential 1.5" Meter – 2,237 Accounts



	Gallons	Bills	Impact
Tier 1	0 – 2.5K	13%	Decrease
Tier 2	2.5K – 6.0K	12%	Decrease
Tier 3	6.0K – 20.0K	28%	Decrease/Increase
Tier 4	Over 20.0K	47%	Decrease/Increase

Proposed Water Rates – Bill

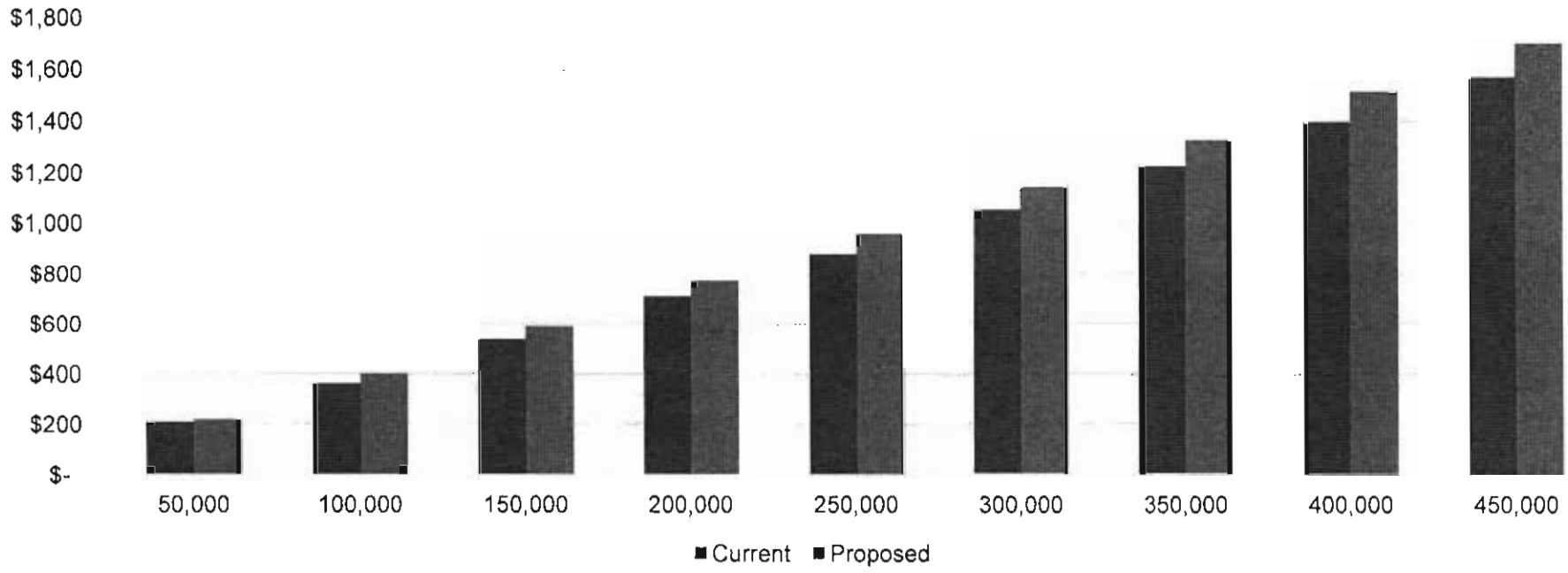
Non Residential 2" Meter – 3,016 Accounts



	Gallons	Bills	Impact
Tier 1	0 – 2.5K	10%	Decrease
Tier 2	2.5K – 6.0K	5%	Decrease
Tier 3	6.0K – 20.0K	16%	Decrease
Tier 4	Over 20.0K	69%	Increase

Proposed Water Rates – Bill

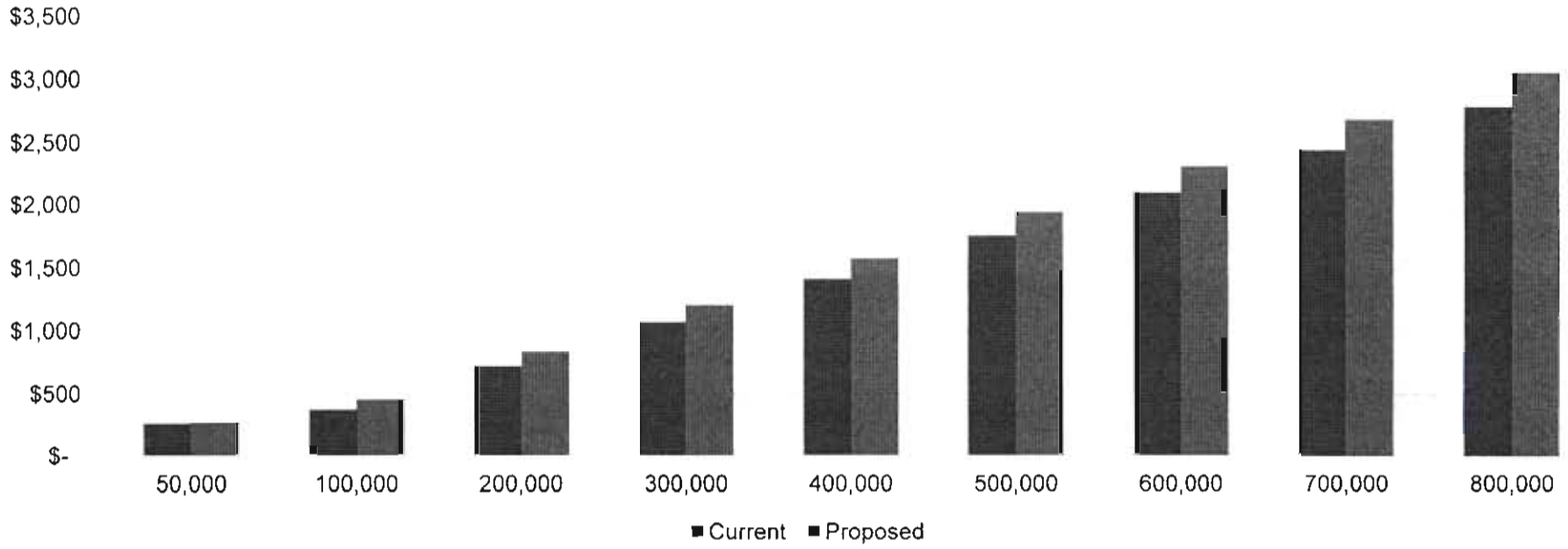
Non Residential 3" Meter – 286 Accounts



	Gallons	Bills	Impact
Tier 1	0 – 2.5K	26%	Decrease
Tier 2	2.5K – 6.0K	6%	Decrease
Tier 3	6.0K – 20.0K	10%	Decrease
Tier 4	Over 20.0K	58%	Increase

Proposed Water Rates – Bill

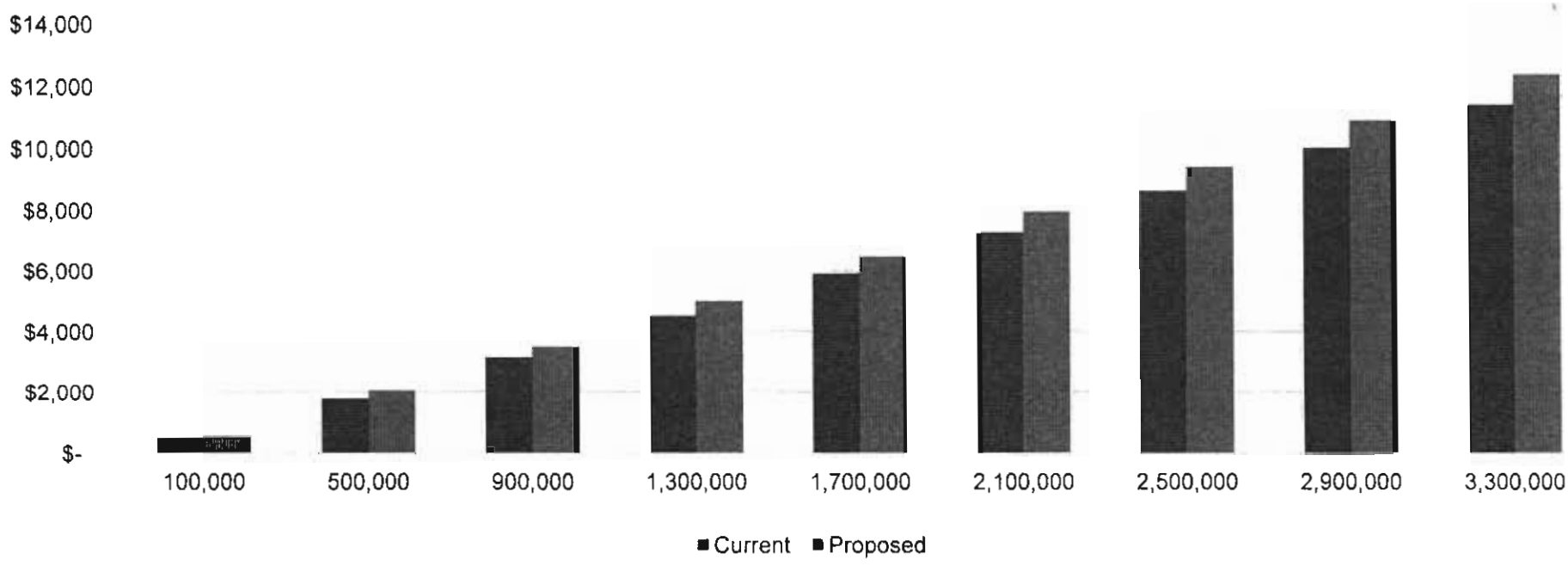
Non Residential 4" Meter – 97 Accounts



	Gallons	Bills	Impact
Tier 1	0 – 2.5K	16%	Decrease
Tier 2	2.5K – 6.0K	1%	Decrease
Tier 3	6.0K – 20.0K	3%	Decrease
Tier 4	Over 20.0K	80%	Increase

Proposed Water Rates – Bill

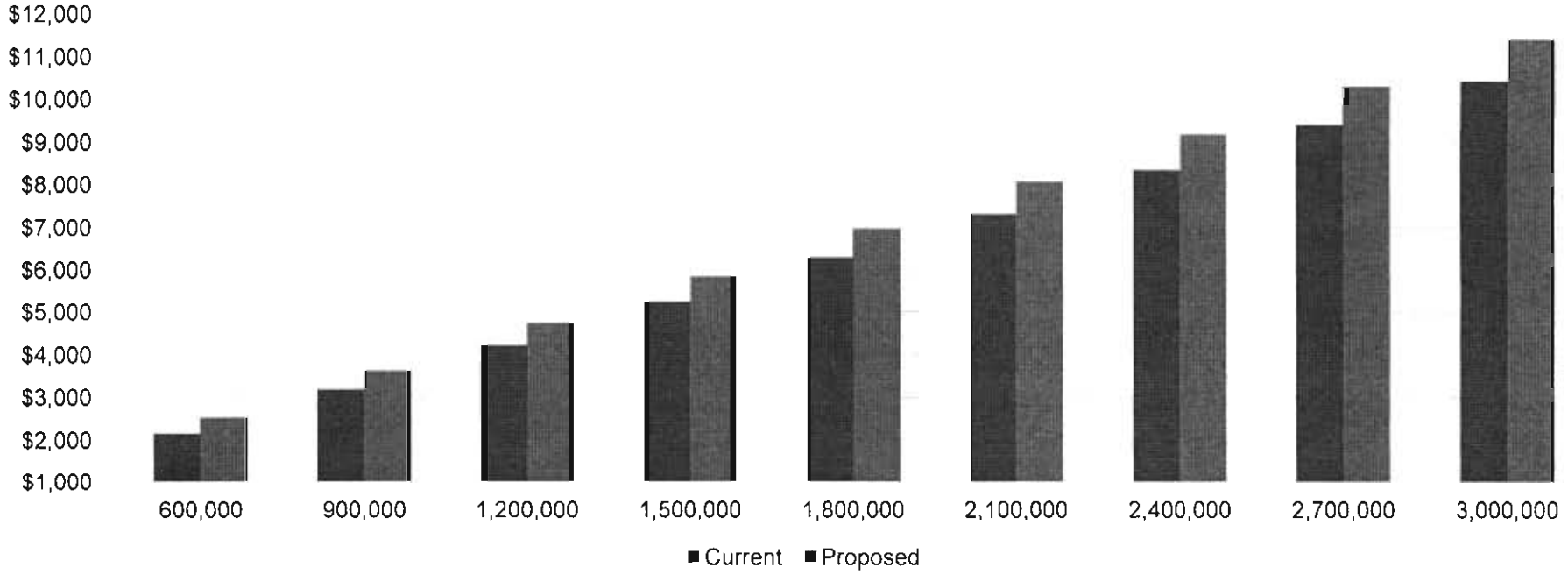
Non Residential 6" Meter – 65 Accounts



	Gallons	Bills	Impact
Tier 1	0 – 2.5K	20%	Decrease
Tier 2	2.5K – 6.0K	1%	Decrease
Tier 3	6.0K – 20.0K	1%	Decrease
Tier 4	Over 20.0K	78%	Increase

Proposed Water Rates – Bill

Non Residential 8 Inch Meter – 6 Accounts



	Gallons	Bills	Impact
Tier 1	0 – 2.5K	33%	Decrease
Tier 2	2.5K – 6.0K	<1%	Decrease
Tier 3	6.0K – 20.0K	<1%	Decrease
Tier 4	Over 20.0K	67%	Increase

Sewer / Water Reclamation Rates

Sewer Rate Structure

- Current Strength-Based (loading) Structure:
  - Flow
  - Biological Oxygen Demand (BOD)
  - Total Suspended Solids (TSS)
- Updated loading factor and cost allocation:
  - Update to Chemical Oxygen Demand (COD) vs. BOD
  - Update functional cost allocation to flow, BOD and TSS

Proposed Changes to Sewer Rate Structure

- Strength-Based Structure - update loadings
  - Largest impact to:
    - Restaurants and Commercial with Dining
    - Mortuaries
- Addition of Non Compliant category
- New definition for Food Service Establishment

Current & Proposed Functional Cost Allocation

- Current functional cost allocation
  - Fixed and Flow – 68%
  - BOD – 15%
  - TSS – 17%
- Proposed functional cost allocation
  - Flow – 66%
  - COD – 16%
  - TSS – 18%

Sewer Rate Calculation

Restaurant using 8,000 gallons

	Current Charges	Proposed Charges
Volume Charges	$204.60	$288.71
Environmental Fees (18.953%)	$38.78	-
Total Volume Charges	$243.38	$288.71
Customer Service Fee	$1.09	-
Environmental Fees (18.953%)	$0.21	-
Total Customer Service Fees	$1.30	-
Total Sewer Charge	**$244.68**	**$288.71**

The proposed rate structure incorporates the environmental and customer service charges into the basic rate structure.

Sewer Volume Rate Comparison

Classification	Number of Customers	Current Charge per 1K Gallons	Proposed Charge per 1K Gallons	Difference in Dollar Amount
Single Family Residential	73,022	$2.65	$2.73	$0.08
Multi-family Residential	2,658	$2.65	$2.73	$0.08
Commercial without Dining	3,119	$2.59	$2.27	($0.32)
Commercial with Dining	170	$2.95	$3.14	$0.19
Hotels/Motels without Dining	64	$2.69	$2.71	$0.02
Hotels/Motels with Dining	84	$3.15	$4.19	$1.04
Car Washes	24	$2.50	$2.21	($0.29)
Commercial Laundry	10	$3.26	$3.25	($0.01)

Current sewer volume charges shown above have been adjusted for an environmental water quality charge of 18.953% and not the per user customer service fee of $1.09. The proposed sewer volume charges will incorporate these charges into the basic rate structure.

Sewer Volume Rate Comparison

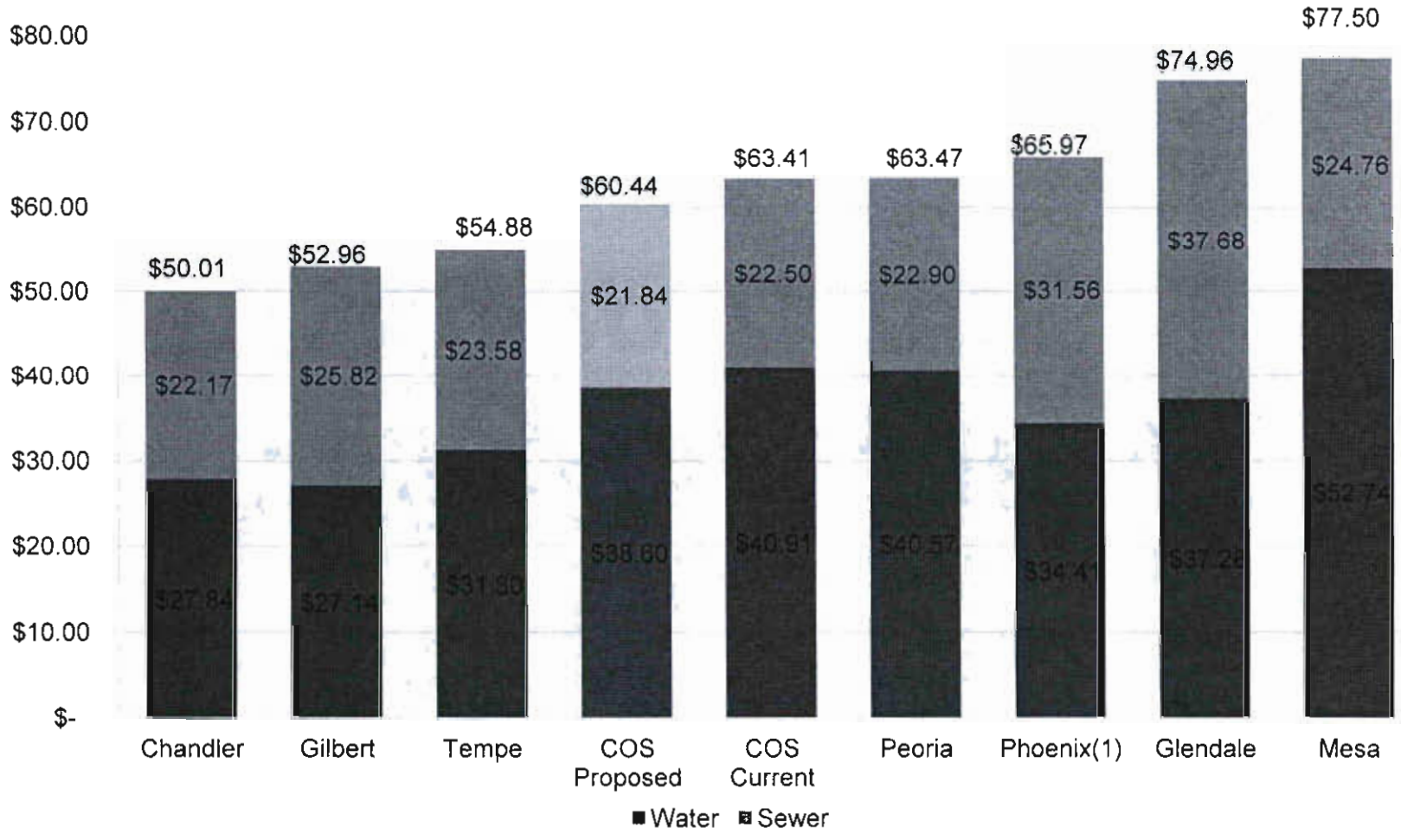
Classification	Number of Customers	Current Charge per 1K Gallons	Proposed Charge per 1K Gallons	Difference in Dollar Amount
Mortuaries	4	$3.71	$5.32	$1.61
Laundromats	7	$2.62	$2.37	($0.25)
Metal Platers	6	$2.65	$2.27	($0.38)
Restaurants & Bakeries	324	$4.43	$5.25	$0.82
Service Station Auto Repair	178	$2.69	$2.82	$0.13
Medical Institutions	117	$2.82	$2.55	($0.27)
Schools	83	$2.62	$2.31	($0.31)

Current sewer volume charges shown above have been adjusted for an environmental water quality charge of 18.953% and not the per user customer service fee of $1.09. The proposed sewer volume charges will incorporate these charges into the basic rate structure.

Valley Utility Bills Comparisons

Residential Utility Bill Comparison

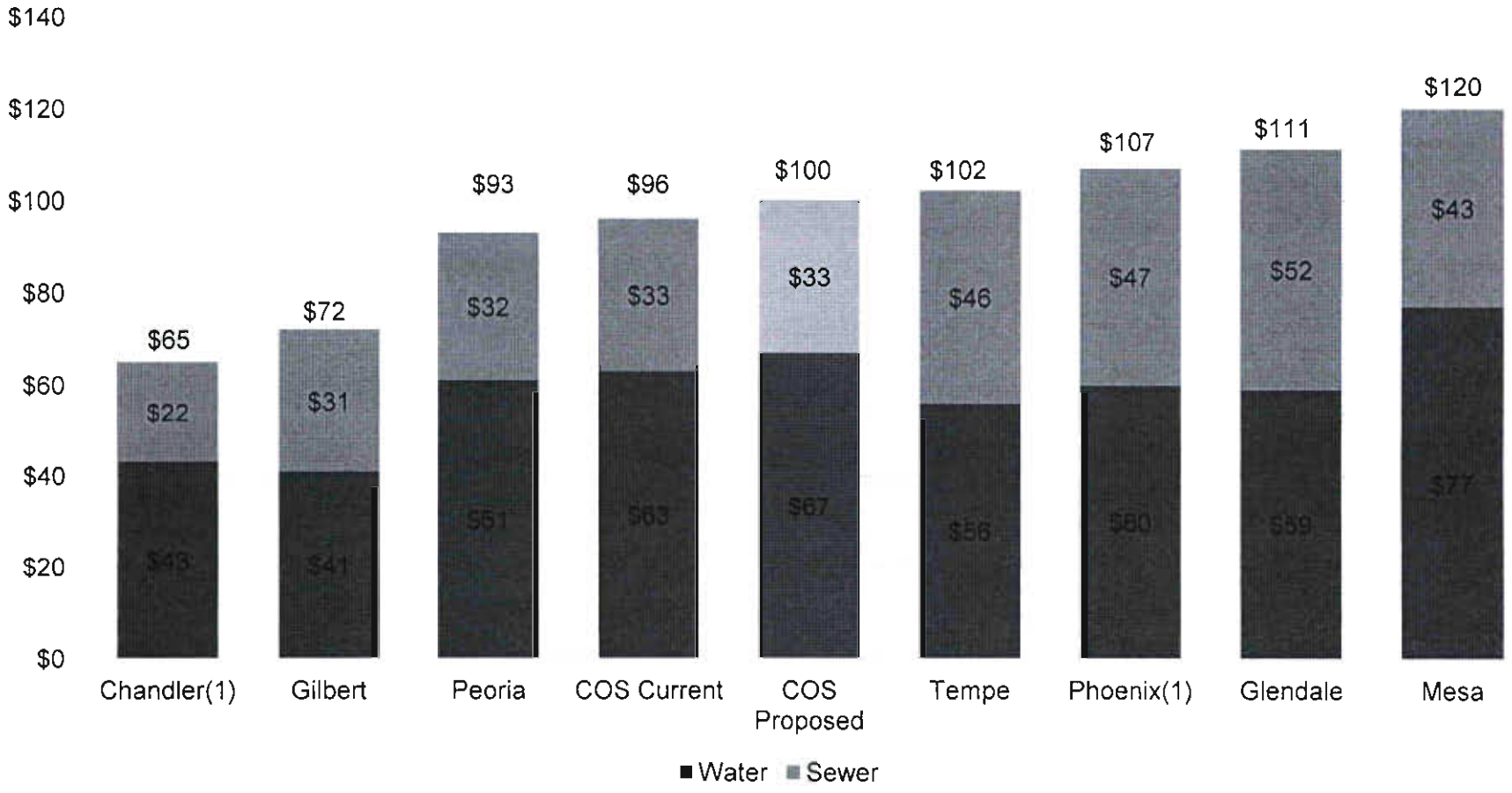
5/8" Meter, Water Use 11,500 Gallons, Sewer 8,000 Gallons



(1) Average for seasonal rates

Residential– Typical Bill

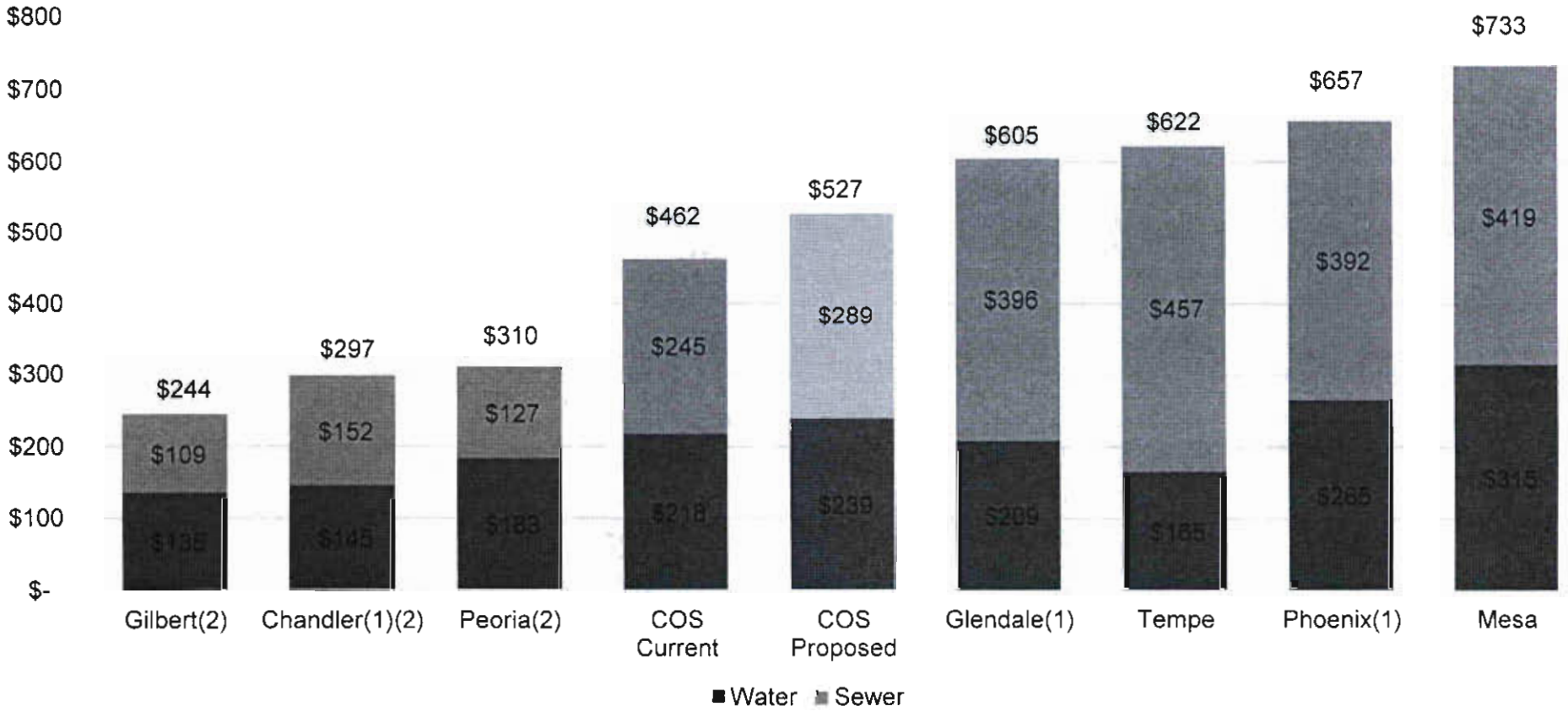
1" Meter Using 17,000 Gallons, 12,000 Gallons Sewer



(1) Average for seasonal rates

Restaurant Utility Bill Comparison

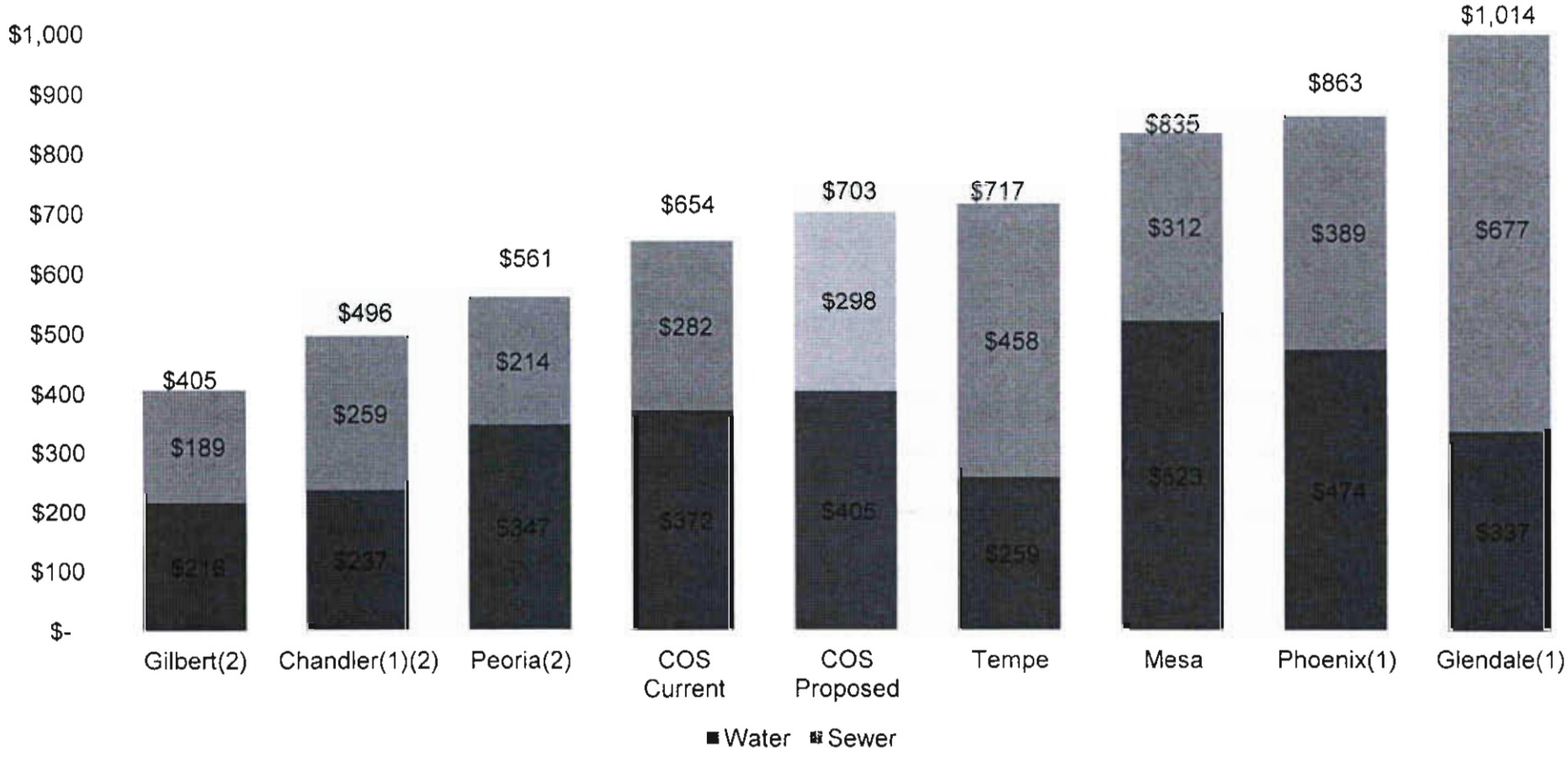
1.5" Meter, Water Use 61,000 Gallons, Sewer 55,000 Gallons



(1) Average for seasonal rates
(2) Cities do not have distinctions between types of sewer customers

Commercial with Dining Utility Bill Comparison

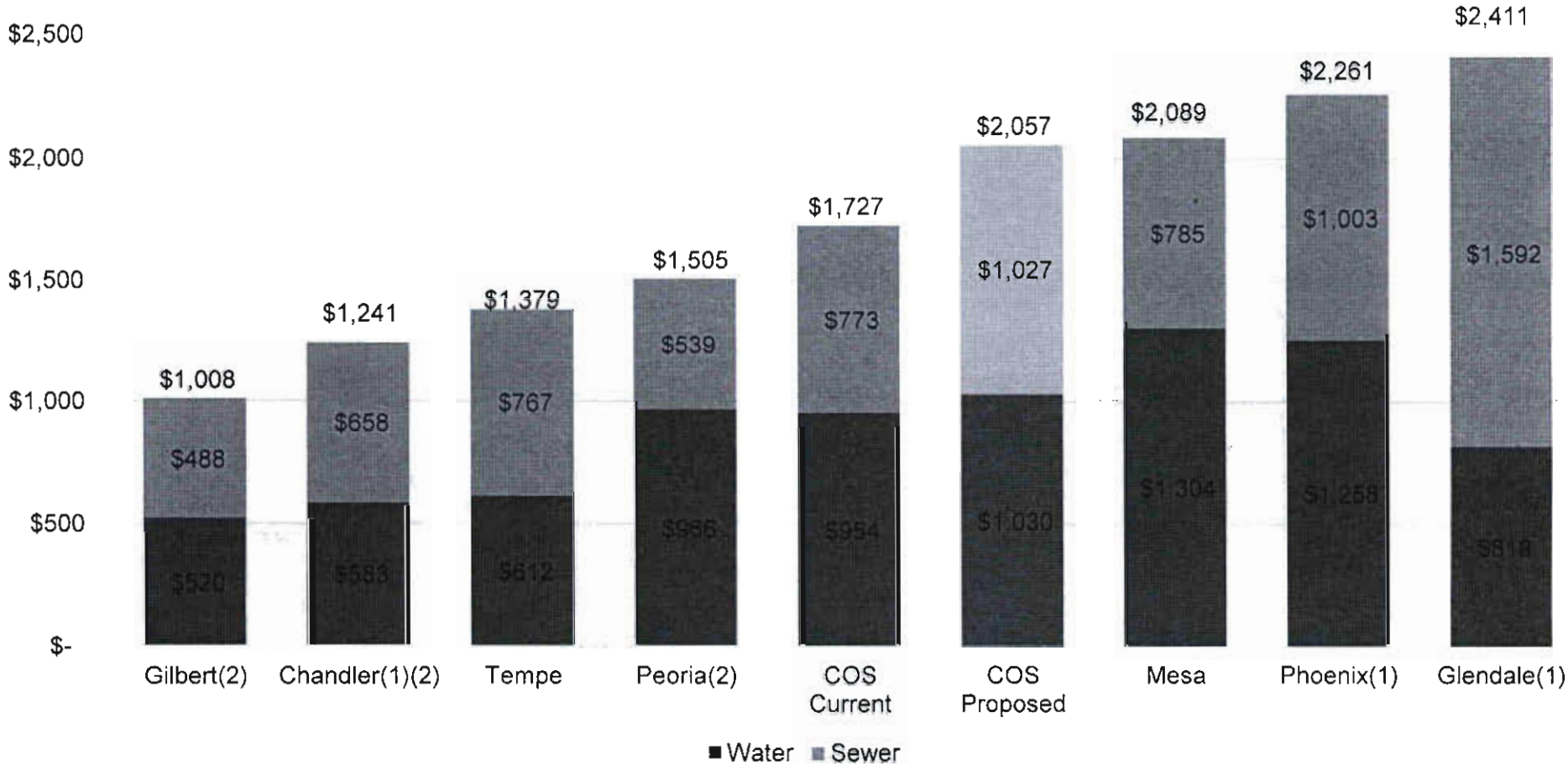
1.5" Meter, Water Use 106,000 Gallons, Sewer 95,000 Gallons



(1) Average for seasonal rates
(2) Cities do not have distinctions between types of sewer customers

Hotel with Dining Utility Bill Comparison

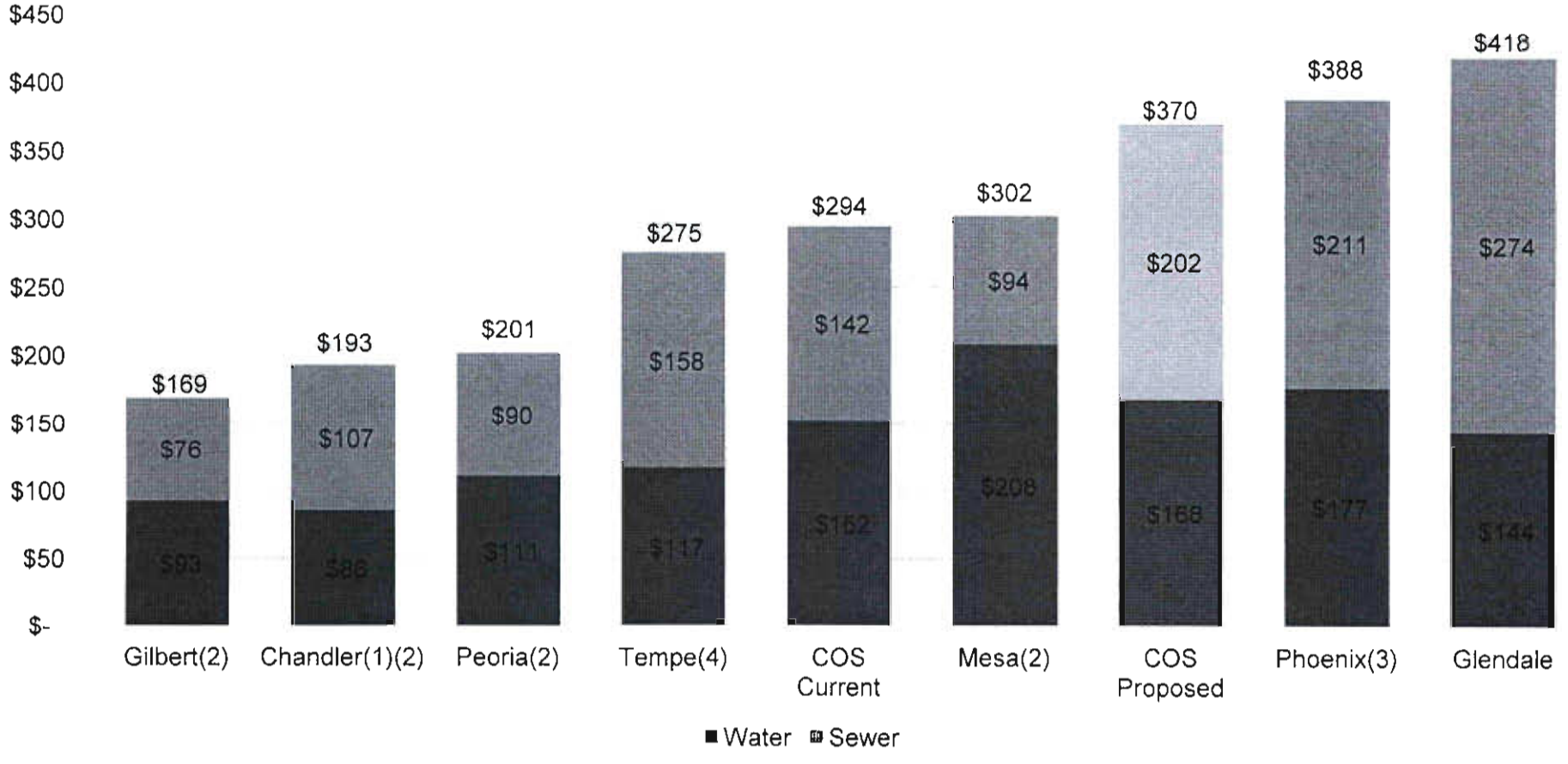
1.5" Meter, Water Use 275,000 Gallons, Sewer 245,000 Gallons



(1) Average for seasonal rates
(2) Cities do not have distinctions between types of sewer customers

Mortuaries Utility Bill Comparison

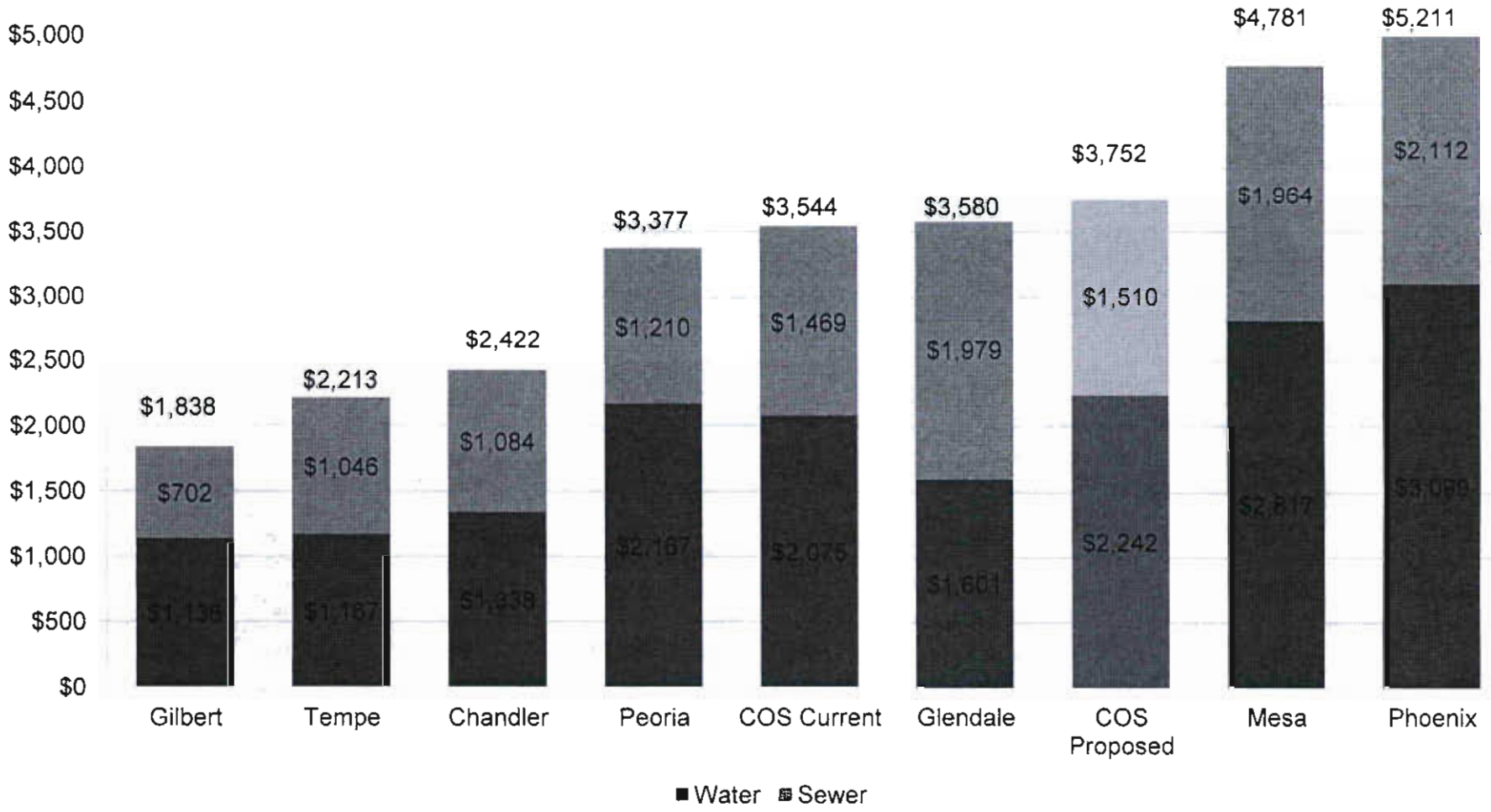
1.5" Meter, Water Use 42,000 Gallons, Sewer 38,000 Gallons



(1) Average for seasonal rates
(2) Cities do not have distinctions between types of sewer customers

Multi-Family – Typical Bill

2" Meter Using 600,000 Gallons, 553,000 Gallons Sewer



Delayed Implementation Sewer Rate Structure

- Adjust percent of water use billed as sewer from 90% of average to 80% of average
- Restructure sewer rates based on lowest "Winter Average":
  - January, February, March water usage
- Changes will result in rate increases and volume reductions for a net zero impact for majority of customers

Next Steps

- **April 3** - Notice of intent to modify city code and sewer rate increase
- **May 15** - Public hearing and adoption of new rate structure
- **July 1** - Proposed effective date of rate structure changes and sewer rate increase

Food Service Establishment

- Proposed Definition for Code Section 1:
  - **FOOD SERVICE ESTABLISHMENT** means any place where food that is intended for individual service and consumption is routinely provided completely prepared. The term includes any such place regardless of whether consumption is on or off the premises and regardless of whether there is a charge for the food. The term does not include a private home where food is prepared for individual family consumption, and it does not include the location of food vending machines.

Questions?